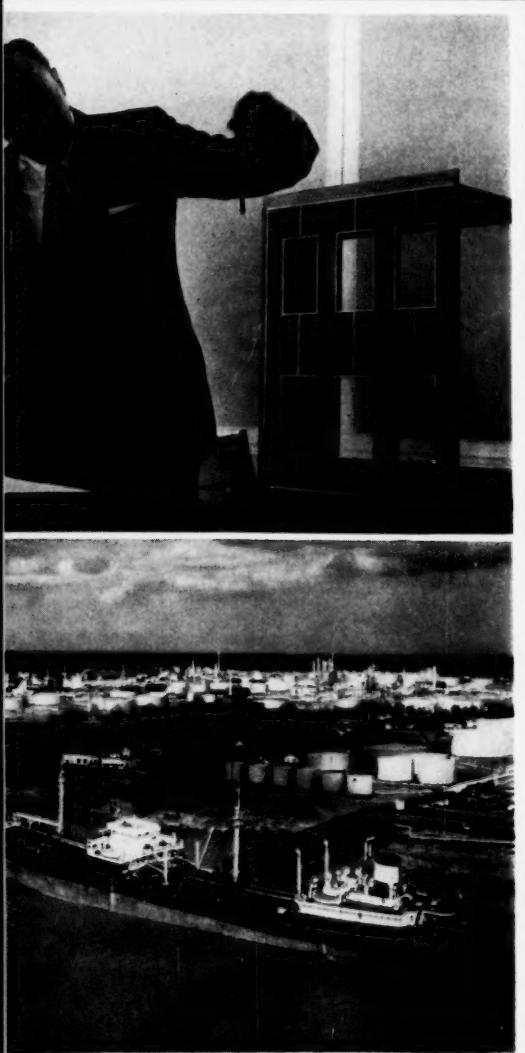


Chemical Week

December 7, 1957

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Triple play in polypropylene:
Hercules, Hoechst and Montecatini
launch plants p. 31

◀ **Get more for your lab dollar.**
Architects' tips on saving construction costs p. 41

'58 specialties outlook—flock of new products, some new capacity.
CW survey tells the story . p. 74

◀ **Louisiana's chemical complex is big and growing. Drawing cards: water, gas and oil p. 59**

Consumption of calcium chloride is rising, spurred by road building, mounting concrete output . p. 109

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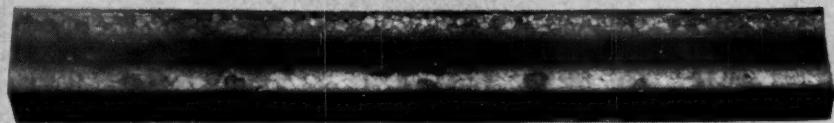
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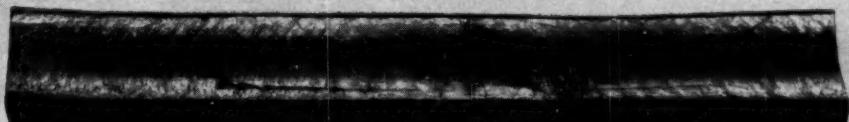
TYPICAL TEST EXTRUSIONS



CHEMIGUM N-8



NITRILE RUBBER "A"



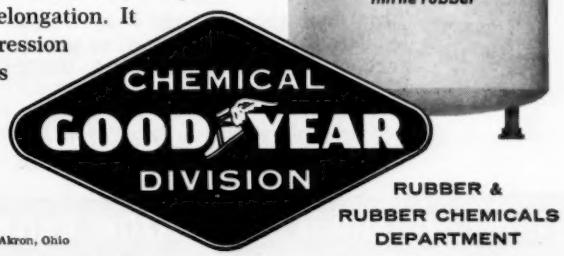
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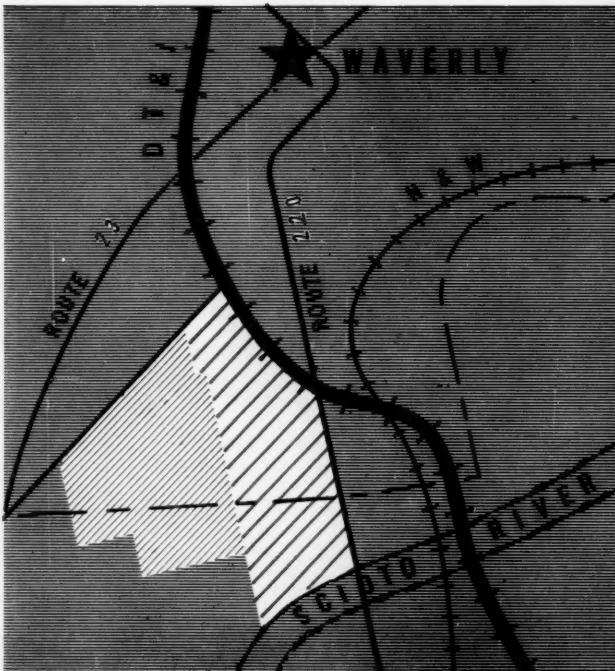
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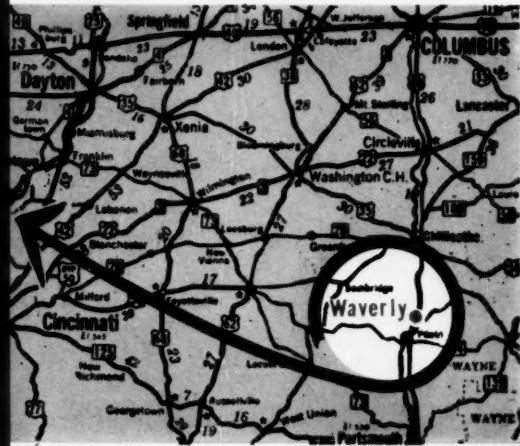
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No. 23

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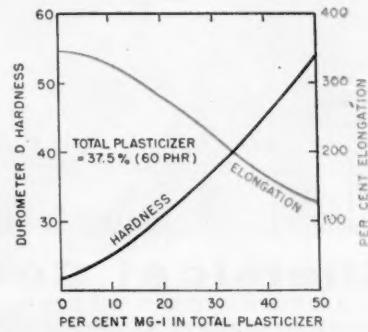
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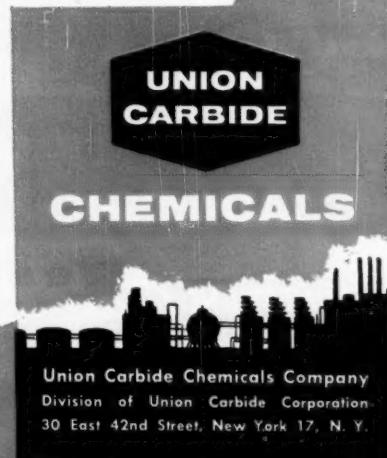
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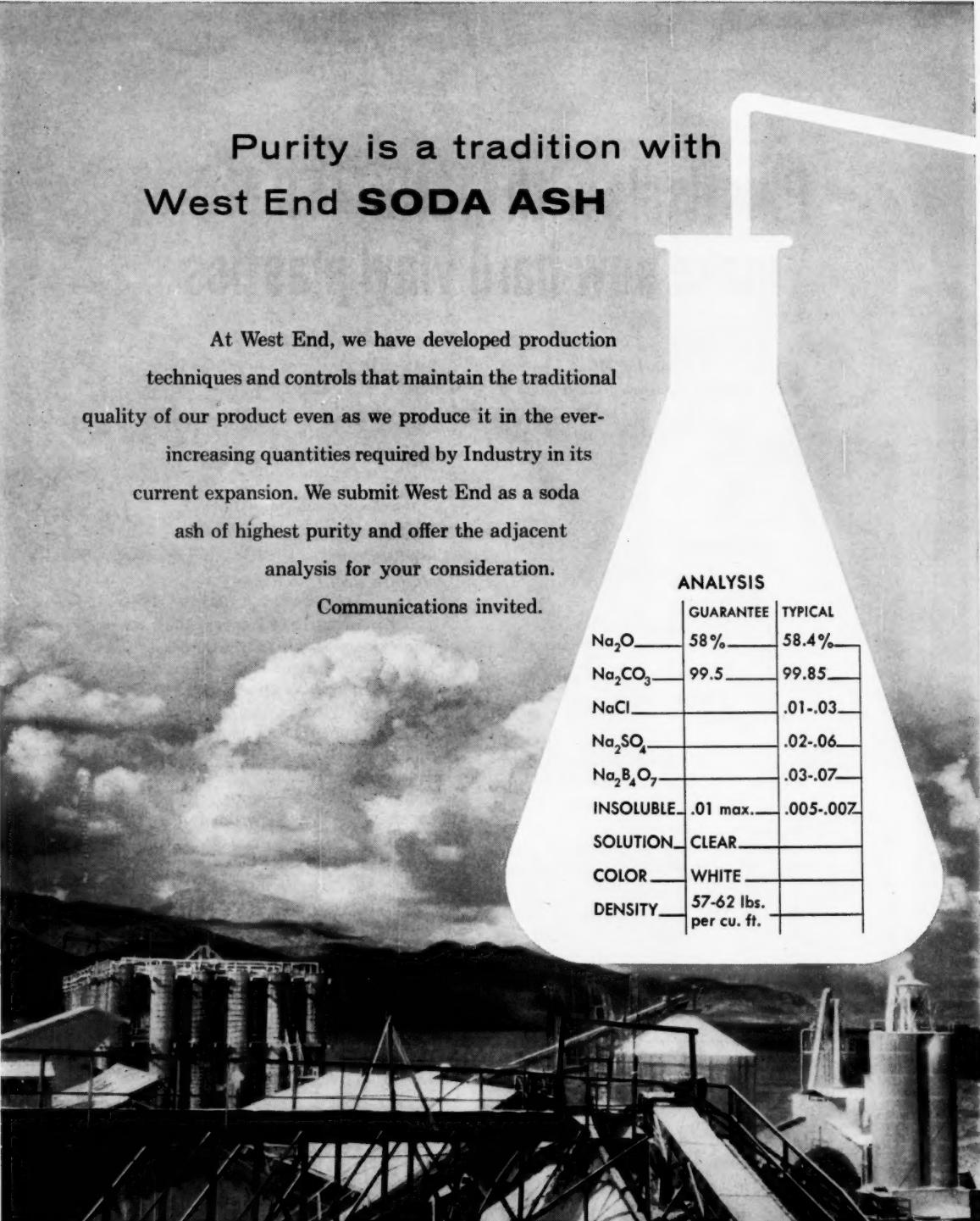
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	GUARANTEE	TYPICAL
Na ₂ O	58%	58.4%
Na ₂ CO ₃	99.5	99.85
NaCl		.01-.03
Na ₂ SO ₄		.02-.06
Na ₂ B ₄ O ₇		.03-.07
INSOLUBLE	.01 max.	.005-.007
SOLUTION	CLEAR	
COLOR	WHITE	
DENSITY	57-62 lbs. per cu. ft.	



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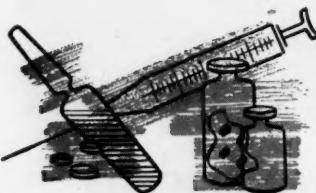
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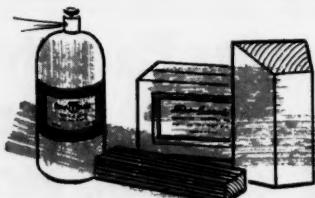


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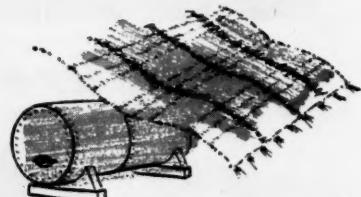
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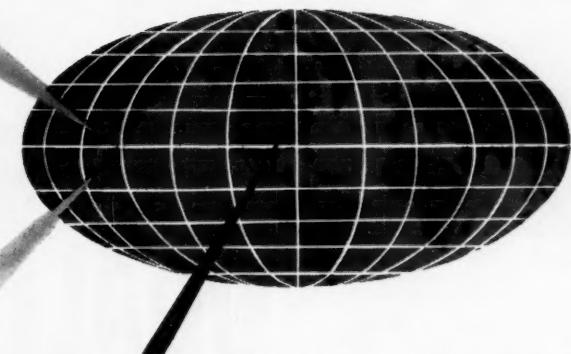
A view of the 90 tons per day Urea Plant at Niigata designed by Chemico for Nippon Gas Chemical Industries Ltd.



A part of the 120 tons per day Urea Plant designed by Chemico for Sumitomo Chemical Company Ltd. at Niihama.

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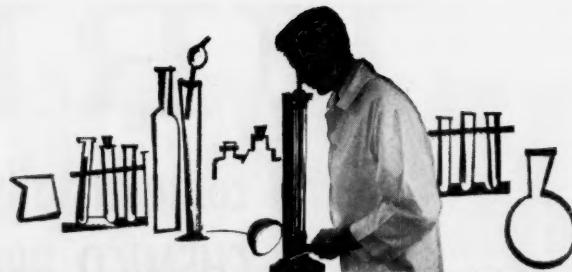
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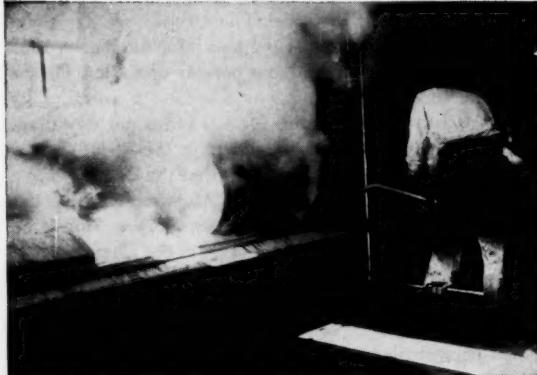


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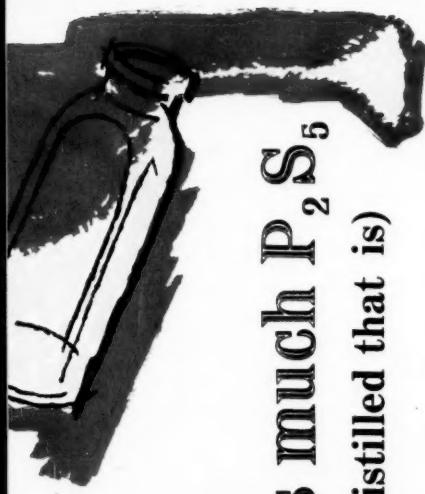


this much P_2S_5 (distilled that is)

Combine the correct amounts of Victor distilled phosphorus pentasulfide with suitable organic intermediates, and you have the ideal combination for a modern oil additive. Oil additives are essential for today's high compression engines, and phosphorus contributes unique properties when combined with lubricants in the *race* for top performance in the petroleum industry.

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this much Victor Cream . . .

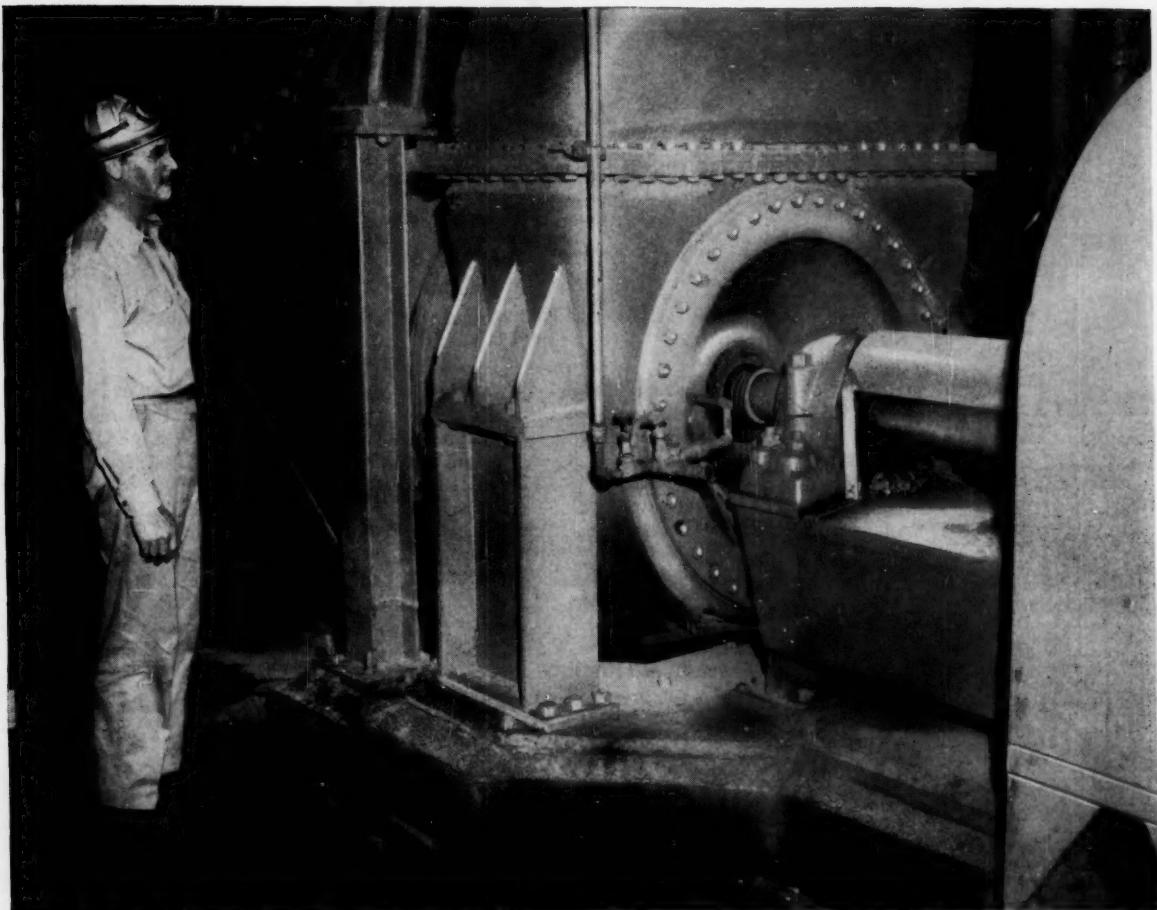


Add about one and one-quarter percent of Victor Cream (Donut grade, sodium acid pyrophosphate) to the proper amount of doughnut mix, and you get doughnuts that can cause a kitchen caper like this.

Getting the right combination of phosphate leavening agents for a doughnut mix can be quite tricky . . . grease absorption, texture, volume, and uniformity of shape are all important . . . and that's where Victor's phosphate know-how and technical service performance make a hit.

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One of the two cast stainless steel (ACI Type CF-7M) screw pumps used to circulate a highly corrosive salt in a large evaporator at Westvaco Chlor-Alkali Divi-

sion, Food Machinery & Chemical Corporation, South Charleston, West Va. The stainless steel castings lasted twice as long as the best material previously used.

Cast stainless steel doubles the life of pump handling hot corrosive salt

The pump above circulates a solution of calcium and magnesium chlorides with 8-10% solid NaCl in suspension. Specific gravity: 1.4. pH value: 6 at 220°F.

Engineers at Westvaco Chlor-Alkali tried a number of materials for this pump.

Copper and bronze parts failed in 15 months. Cast iron parts lasted 3 years. One type of stain-

less steel lasted 4 to 5 years.

They finally found what they wanted in Alloy Casting Institute Type CF-7M (19% Cr, 9% Ni, 2.5% Mo, 0.07% max C) stainless steel castings. These nickel-containing castings have been in service *9 years. That's twice the life of the best material previously used. And still no sign of corrosion!*

Perhaps a cast (or wrought) stainless steel containing nickel can solve your corrosion problem, or meet some other specific need. For information to help you select the right alloy, get in touch with Inco's Development and Research Division. They'll be glad to help.

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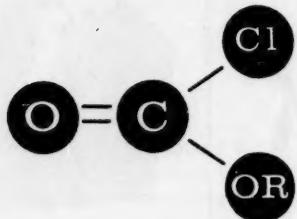
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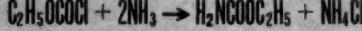
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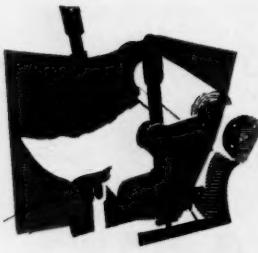


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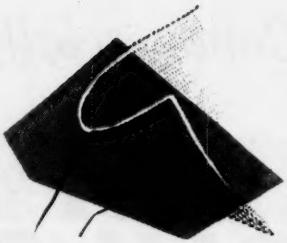
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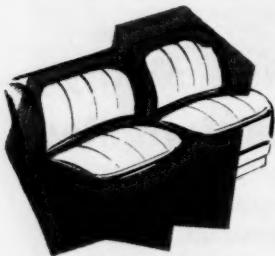
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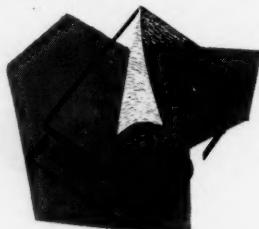


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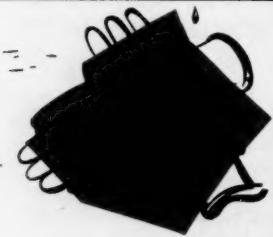


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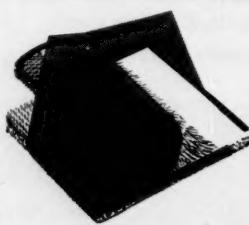
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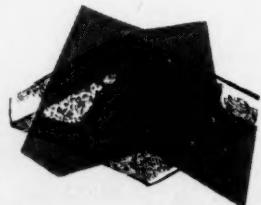
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OPINION

Sequestrant Interest

TO THE EDITOR: Your "Squeeze on Sequestrants" article (Nov. 2, p. 65) is excellent; highly informative, it makes interesting reading—and a lot of people are interested in sequestrant chemistry. . . .

T. R. BOYLE
Manager, Business Research Dept.
Wyandotte Chemicals Corp.
Wyandotte, Mich.

AP&C's Perchlorate

TO THE EDITOR: . . . We should like to call your attention to either a typographical error or an error in statement concerning the production of sodium perchlorate in this country, as indicated in your article titled "Teamed for Future in Fuels" (Oct. 5, p. 23). According to this statement—attributed to Gordon Chambers, board chairman of Foote Mineral Co., in discussing their arrangement with Hooker Electrochemical Co. for the production of ammonium or lithium perchlorate—Hooker is the largest U.S. producer of sodium perchlorate, the starting material for other perchlorate products.

While Hooker at the present time may be the largest U.S. producer of sodium chlorate, American Potash & Chemical Corp. is not only the largest but also the only commercial producer of ammonium perchlorate, which, based on sodium perchlorate, would in itself make American Potash the largest U.S. producer of sodium perchlorate. In substantiation of this, you indicate further in your own article that American Potash operates the ammonium perchlorate

facility at Henderson, Nev., for the Navy and other Defense Dept. demands.

We should appreciate very much your efforts to correct any erroneous impression that might have been given by your article concerning who actually is the largest perchlorate, not chlorate, manufacturer in the U.S. at this time. I might add that considerable excess capacity is available over current and near-term projected demands in the Navy facility we are operating.

WILLIAM J. F. FRANCIS
Vice-President
American Potash & Chemical Corp.
Los Angeles

Right. Hooker is the largest producer of sodium chlorate, not perchlorate.—ED.

What Price Delrin?

TO THE EDITOR: . . . An article in the Oct. 26 issue . . . caused a great deal of distress in our plastics division. I refer to the story on plastics by Dr. Irving Skeist.

Toward the end of his article, Dr. Skeist has a section on what he calls "acetals," in which, incidentally, he misspells the trademark for Du Pont's new acetal resin. Delrin is the correct spelling. In this section, Dr. Skeist says: "What makes this thermoplastic especially interesting . . . is its projected price of 50¢ lb."

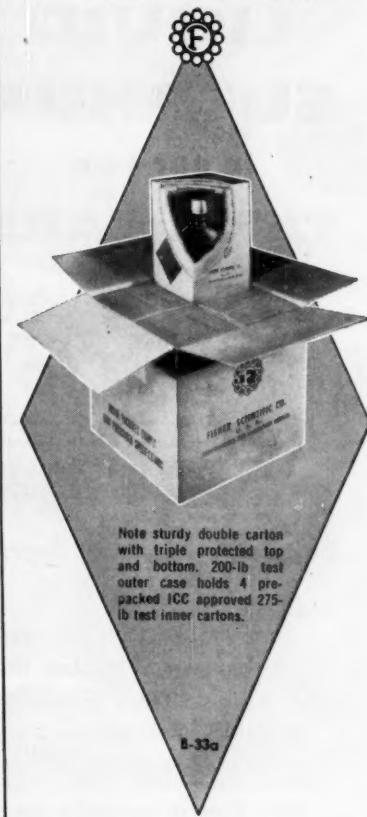
We feel quite strongly that this statement is outside the realm of accurate reporting, and could be harmful in our sales development and marketing programs. Since we have not ourselves set a price on the plastic, it is difficult to see how Dr. Skeist was able to set one with such complete assurance. We have said . . . that it is expected the material will sell at around \$1/lb.

I suppose Dr. Skeist needed this particular bit of speculation in order to launch into his next statement, which reads: "At this figure, it could replace nylon for gears, bearings, aerosol bottles." In our opinion, Delrin will not "replace" nylon so much as it will complement it. There may be some superficial similarity, but a close look at the properties of each plastic would indicate . . . that there is ample room

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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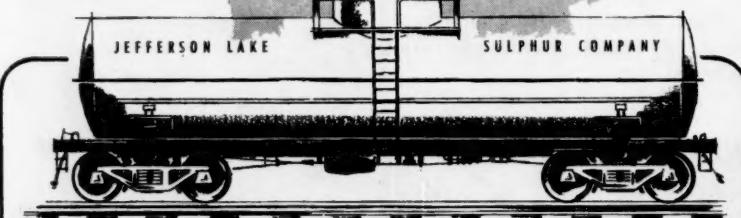
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OPINION

and ample uses for each plastic to grow and flourish as a versatile engineering material . . .

HAROLD G. BROWN, JR.
 E. I. du Pont de Nemours & Co.
 Wilmington, Del.

Du Pont says: "It is expected the resin will be introduced commercially at a price under \$1/lb." Dr. Skeist based his projection on historical precedent and the cost of starting material. CW, not Skeist, inadvertently misspelled the tradename.—ED.

Harshaw Still Jobs

TO THE EDITOR: . . . The article [on Harshaw] (Oct. 26) is well done and gives us an excellent start in the program we are getting under way.

The section titled "Merchandising Myth" might indicate to some that we no longer act as jobbers. True, we are continually emphasizing our manufacturing strength, and this is growing more rapidly than the merchandising department. This we believe is a good sign. However, we still retain our jobbing position on those chemicals that help us to serve our regular customers with their chemical needs. We will continue to hold to our early philosophy of "finding the chemical needs of industry and serving them."

C. S. PARKE
 President
 The Harshaw Chemical Co.
 Cleveland

MEETINGS

Society of the Plastics Industry, eighth SPI film, sheeting and coated fabrics division conference, Commodore Hotel, New York, Dec. 10-11.

North Central Weed Control Conference, 14th annual meeting and exhibit, Veterans Memorial Auditorium, Des Moines, Dec. 10-12.

Soap Industry Convention, Waldorf-Astoria, New York, Jan. 22-24.

Plant Maintenance and Engineering Show, International Amphitheatre, Chicago, Jan. 27-30.

Society of Plastics Engineers, meeting on Progress Through Plastics Engineering, Sheraton-Cadillac Hotel, Detroit, Jan. 28-31.

Reinforced Plastics Division of Society of Plastics Industry, 13th annual technical and management conference, Edgewater Beach Hotel, Chicago, Feb. 4-6.

1. UNTREATED RUSTY BOLTS



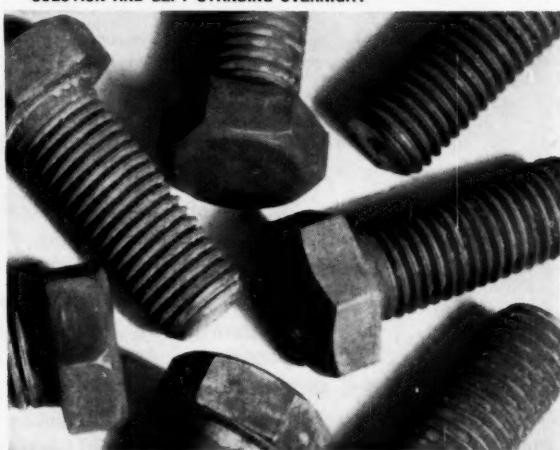
2. BOLTS DERUSTED WITH HYDROCHLORIC ACID SOLUTION
AND LEFT STANDING OVERNIGHT



3. BOLTS DERUSTED WITH HOT CAUSTIC SODA SOLUTION
AND LEFT STANDING OVERNIGHT



4. BOLTS DERUSTED WITH HOT CAUSTIC SODA-GLUCONATE
SOLUTION AND LEFT STANDING OVERNIGHT



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Business Newsletter

CHEMICAL WEEK
December 7, 1957

Scott Paper is launching its venture into nonpaper products with a new polyurethane foam called Scottfoam. The 80-year-old paper-maker is now producing flexible polyurethane—foams that have insulation, cushioning and filtration applications—in a new unit of its Chester, Pa., facilities.

Although it has made its own wet-strength resins for paper treatment, Scott has never before produced chemicals for noncaptive use. The company is buying the basic raw materials for its foam production, formulating them under its own patent-applied-for processes. Capacity of the new plant, due in full production by year's end, has not been revealed.

Where will that proposed \$14-million helium plant be located?

Site of the 240-million-cu.-ft./year unit (*Washington Newsletter*, Nov. 30) has not yet been decided by the government, but it's known that officials want to keep it away from the other extraction plants (at Excell and Amarillo, Tex., Shiprock, N. M., and Otis, Kan.) for security reasons. Yet, it should be near natural gas sources. Chances are that the plant—if it is built—will be in the Oklahoma-Texas panhandle region. Dexter, Ark., however, has launched a campaign to snare the project, pointing out that it had a privately operated helium plant in the 1920s.

Jelled paint for Germany? General Mills has licensed Schering AG. in West Berlin to make its polyamide resin, Versamide—key ingredient of thixotropic paints.

Four chemical companies operating in Tennessee face damage suits totaling over \$1.1 million. Victor, Monsanto, National Carbon and International Minerals & Chemical are accused in nine separate suits of damaging livestock, crops and soil in Maury and Giles counties. The alleged damage is said to have been caused by the release of fluorine gas and "other detrimental compounds." The suits, with the exception of the one against Monsanto, will be tried before juries in Columbia, Tenn., federal court.

Carbide's Bakelite Division is boosting epoxy resin output. The company will add 15 million lbs./year of capacity to its Marietta, O., epoxy plant, plans to have its new facilities in operation by early '59. Bakelite has long held a fast-write-off certificate from the Office of Defense Mobilization for an epoxy plant (*CW*, Sept. 15, p. 80).

Du Pont foresees a pretty good year in '58 despite some "business adjustment." That's shown in the most recent issue of the company's

Business

Newsletter

(Continued)

supervisory newsletter. Du Pont economist Ira Ellis says he's looking for a high level of consumer spending in '58, foresees a good year for automobiles, residential, road and school construction. But he also terms '58 a year of "business adjustment," with reduced business spending for manufacturing plants and equipment.

More militant bargaining by International Chemical Workers

Union next year is suggested by union President Walter Mitchell's call for larger strike funds. Mitchell wants local unions to build up strike funds, recommends they invest 25¢/member/month for this purpose.

Electrochemical plants in the Pacific Northwest were hit again

last week—by a new cutback in interruptible power from Bonneville Dam. Power from Bonneville had been restored from a previous cut only two weeks ago. All interruptible power loads, totaling 358,000 kws., were cut because of low stream flow in the Columbia River. Provisional power from Hungry Horse Dam will be used for a few days to permit the companies to adjust to the power cutbacks.

A strike has forced Hooker to close its brand-new plant in North Burnaby, British Columbia. Walkout of pulp and paper workers in the area has so slashed the demand for chemicals produced by the plant (capacity is 110 tons/day of caustic soda, 100 tons of chlorine) that Hooker has laid off 100 and shut its plant for the strike's duration.

Informal interpretations of food, drug and cosmetic regulations are now offered by Food & Drug Administration.

Like FDA's formal legal notices, the new interpretive notes are published in the *Federal Register*, will also be available in reprints. Firms already on FDA's mailing lists (or those requesting to be included) will automatically receive the reprints.

First 13 of the new advisories in the series are in the Nov. 30 *Federal Register*. In this first batch, FDA says, it will permit use of pyrolineous acid in foods, if the compound is pure, used only for flavoring, and is so labeled; it prohibits the use of quaternary ammonium compounds in food; it does not term sprout inhibitors as pesticides. The agency also explains its views on the disposition of outdated drugs—they're not to be sold or used unless their potency has been ascertained. It also explained its positions on several other labeling matters.

Smog with a \$1-million price on its head? Los Angeles smog control officer Smith Griswold suggested at the recent third annual Southern California Conference on the Elimination of Air Pollution that the automotive industry ante up that amount as a reward for anyone able to solve the smog problem in Los Angeles County.

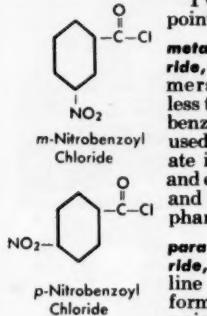
BRIEFS for buyers of

Chloro Aromatics Sodium Chlorate Potassium Chlorate Plastics Intermediates Sodium Tetrasulfide

Where to go for chloro aromatics

If your processing requires use of the benzyl, benzoyl, or nitrobenzoyl groups, you'll find Hooker a convenient source of supply for intermediates.

Two products in point:



meta-Nitrobenzoyl chloride, a mixture of isomers containing not less than 92% m-nitrobenzoyl chloride. It is used as an intermediate in dyes for fabrics and color photography, and in preparation of pharmaceuticals.

para-Nitrobenzoyl chloride, a yellow crystalline material in flake form, assaying 98% by weight min. purity. It is used as an intermediate in manufacture of azo and stilbene dyes, and in pharmaceuticals such as folic acid and novocain.

Your Hooker salesmen will gladly tell you more about these and other chloro aromatics—readily available in quantities as small as 5 gallons and, in some cases, by tank wagon or tank car.

Thoughts on choosing a chlorate supplier

What do purchasing men look for when choosing a supplier of production chemicals?

Quality, service, price—of course. Reputation; what other buyers say is important. What other buyers *do* can be even more significant.

Two cases in point are these chemicals, both of which we produce:

Sodium chlorate (OLDBURY®) has proved its versatility in *dozens* of ways. A strong oxidizing agent, it's used in metallurgy, in dye manufacture, in chemical synthesis.

Farmers in many states use it successfully for weed control. In the Deep South, it defoliates cotton to make the bolls easier to pick with machines.

And now, 36 pulp mills are using sodium chlorate processes for generating chlorine dioxide, bleaching agent for high-strength high-brightness pulp.

Potassium chlorate (OLDBURY), also an oxidizing agent, has just *one* major use. A little of it goes into the heads of three out of every five safety matches made in this country.

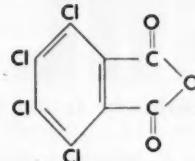
Despite their chemical kinship, it would be hard to find two products farther apart in utilization.

They're very much alike, though, in one important respect: the preference of the men who buy them. In both cases, more purchasing men specify OLDBURY than *all other brands combined*.

It takes a lot of doing to merit confidence like this. Some of the things we do may be the things you look for in a supplier—whether it's for a special-use item like potassium chlorate, or a big-tonnage commodity like sodium chlorate.

Heat-stable intermediate makes plastics resist fire

If you want to build heat stability into a plastic product, take a good look at this molecule of **tetrachlorophthalic anhydride**, trade-named NIAGATHAL®.



Nearly half its weight is concentrated in four chlorine atoms, providing a very stable compound that won't melt unless you heat it to 254°-255° C.

Translate these properties to read "fire resistance," "heat resistance,"

"good electrical qualities"—if, for example, you're adding NIAGATHAL to a polyester resin.

It's most effective in polyesters containing pigment or other filler—lets you load as much as 22% stable chlorine into such resins. When you do this, you come up with a polyester that is inherently, permanently self-extinguishing.

To help you evaluate this chemical, we've put together, in bulletin form, several published papers reviewing its properties and solubilities, its many reactions and suggested uses, as well as suggested uses of derived compounds. To get a copy, just check the coupon for *Bulletin 46*.

Sodium tetrasulfide

For years we've been telling leather tanners about the virtues of Hooker sodium tetrasulfide, Na2S4, as a soaking agent for hides.

If soaking hides is out of your line, here are just a few of the other tasks this chemical can do or is doing:

1. Reducing agent for organic nitro bodies
2. Ore flotation reagent
3. In manufacture of sulfur dyes
4. In preparation of metal sulfide finishes

Hooker sodium tetrasulfide comes to you, in 55-gallon steel drums, as a clear dark-red aqueous solution containing 40% by weight of Na2S4, and less than 1% of other sodium salts. For complete information, check the coupon.

For more information on chemicals mentioned on this page, check here:

<input type="checkbox"/> meta-Nitrobenzoyl Chloride	<input type="checkbox"/> NIAGATHAL (Tetrachlorophthalic anhydride) —Bulletin 46
<input type="checkbox"/> para-Nitrobenzoyl Chloride	<input type="checkbox"/> Sodium Tetrasulfide
<input type="checkbox"/> Sodium Chlorate	<input type="checkbox"/> New list of products —Bulletin 100-A
<input type="checkbox"/> Potassium Chlorate	

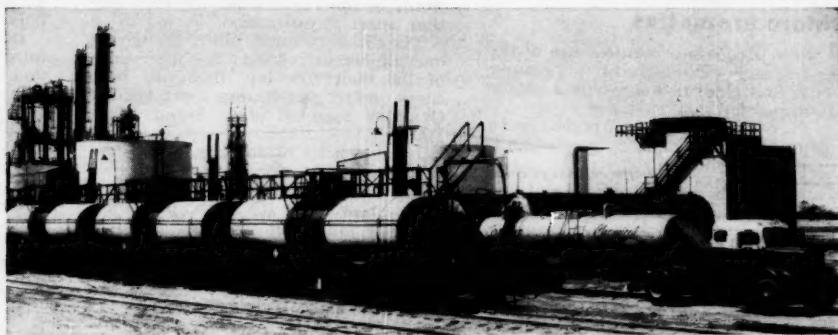
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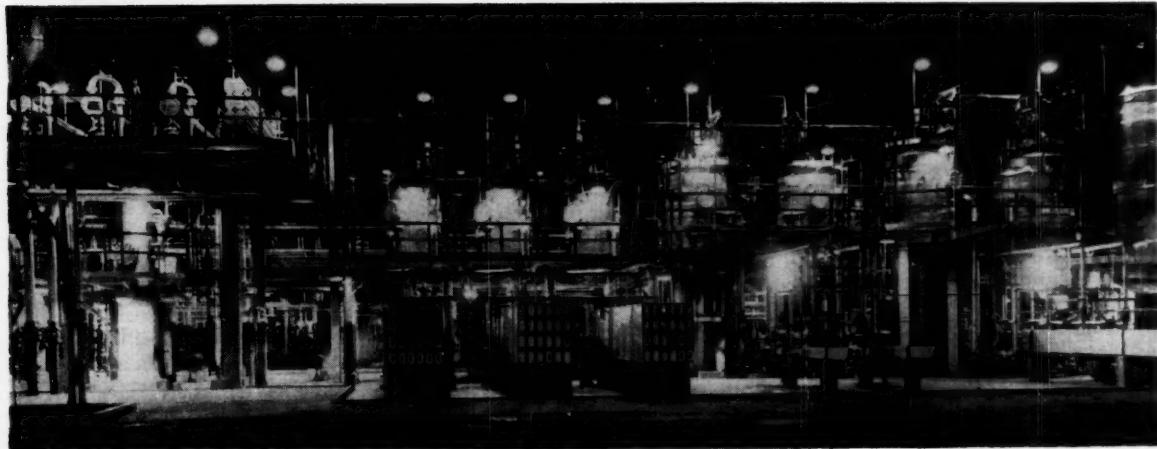
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A DIVISION OF UNION CHEMICAL & MATERIALS CORP.

December 7, 1957



LOW-PRESSURE POLYOLEFIN COMPETITION GETS HOTTER

Company	Product	Plant Location	Construction Cost	Present Capacity	Onstream
Celanese	Polyolefins	Houston, Tex.	(Not available)	40 million lbs.	Feb. '57
Phillips	High-density polyethylene	Houston, Tex.	(Not available)	75 million lbs.	March, '57
Hercules	High-density polyethylene	Parlin, N. J.	Over \$10 million*	30 million lbs.	July '57
W. R. Grace	High-density polyethylene	Baton Rouge, La.	\$18 million*	50 million lbs.	Dec. '57
Montecatini	Polypropylene	Ferrara, Italy	(Not available)	15 million lbs.	Sept. '57
Farwerke Hoechst	Polypropylene	Frankfurt, Germany	(Not available)	16.8 million lbs. **	Nov. '57
Hercules Powder	Polypropylene	Parlin, N. J.	\$7 million†	20 million lbs.	Dec. '57

* Including research and development costs.

** Current rate of production.

† CW estimate.

Polypropylene Makes a 3-Nation Debut

A new petrochemical plastic—polypropylene—vaulted into the headlines on both sides of the Atlantic last week. Making news: Hercules Powder, bringing onstream the first commercial-scale propylene plant in the U.S., Farwerke Hoechst starting large-scale production in West Germany, and Montecatini—which has been in production in Italy since September—preparing to export the new resin to the U.S. and other countries.

(CW, June 16, '56, pp. 64, 79).

But although Director of Development Paul Johnstone, of Hercules' Cellulose Products Dept., and other enthusiasts are sure that polypropylene will quickly capture a big slice of the total plastics market, there was no consternation on the part of U.S. polyethylene producers. On the contrary, leading companies are going right on with major polyethylene expansion programs:

W. R. Grace has just brought onstream its Baton Rouge plant (photo, above), said to be the largest integrated high-density polyethylene plant in operation; Union Carbide is carrying out expansion at Institute, W. Va., and Seadrift, Tex., to bring combined capacity at those two low-pressure process plants to 55 million lbs./year and has announced a 72-million-lbs./year conventional-type polyethylene plant to be completed at

Whiting, Ind., in 1959; Du Pont is now doubling capacity for conventional polyethylene at Orange, Tex., and is completing design studies for a proposed linear-type polyethylene plant at Laplace, La.; and U.S. Industrial Chemicals Co. division of National Distillers and Chemical Corp. will build a 75-million-lbs.-a-year intermediate-density polyethylene plant at Houston, Tex.

Market Surveys: The fact is that virtually all of the major producers and prospective producers of polyethylene have also been at least knee-deep in studies on polypropylene and other polyolefins, but are still sold on polyethylene as the best and most economic polyolefin for many important applications. All of the first three polypropylene producers are staying in the polyethylene business.

Du Pont stresses that it's "definitely looking into polypropylene" in a continuing research and development program in the field of polyolefins; Standard Oil (New Jersey) has distributed polypropylene samples; and one trade source asserts that there are at least six polypropylene pilot plants now in operation in the U.S.

Technology Under Wraps: Polypropylene technology is ultra-secret; who'll come out on top when all pending and soon-to-be-filed patent applications are acted on is anybody's conjecture. Hercules insists that it has developed its own process, but acknowledges that it benefitted from its association with Germany's Professor Karl Ziegler. Montecatini uses a catalyst patented by Giulio Natta.

Research Results: Hercules feels it may be ahead of the field in stabilizing its polypropylene, although some industry people doubt that a stable polypropylene resin has yet been produced. Hercules says its polypropylene possesses a wider range of desirable properties than any single plastic yet developed. In particular, Hercules points to the material's low specific gravity (about 0.90, compared with 0.96 for a typical polyethylene), molding characteristics, ability to withstand boiling-water temperatures for long periods, rigidity and relative hardness.

Consensus is that if its inherent instability has been licked, polypropylene is here to stay. But it's more likely to complement existing plastics than to displace any one resin; and it certainly won't usurp the whole field.



At MCA banquet, Secy. Mitchell bears message from ailing President.

Industry Hears Ike's Plea

Impact of President Eisenhower's call for support on two controversial measures for lower tariffs and freer trade—presented at last week's Manufacturing Chemists' Assn. meeting in New York by Secretary of Labor James Mitchell because illness had prevented the President from making a scheduled major speech in Cleveland that evening—can't yet be fully known, but events following last week's meeting show that the President's request was not without effect on chemical management.

One MCA spokesman, Richard Hanson of Allied Chemical, told CW he is now conducting a telephone poll of the organization's tariff committee members to find out if a stand against tariff reductions should be modified in view of the President's plea. The industry's views on tariff and trade problems are scheduled for presentation at current hearings of the House Ways and Means Committee's Tariff and Trade Subcommittee, headed by Rep. Hale Boggs (D., La.).

Modifications Possible: In the past, industry spokesmen have maintained that a strong domestic chemical industry is necessary for national security and that the industry's vitality could be sapped by import competition if existing tariff and trade laws were weakened. No radical departures are expected from this view, but Hanson is checking to make sure. "It's possible some modifications may result," says Hanson. "Conditions are

different now than they were three years ago when we last endorsed a tariff program."

But tariff proposals weren't the only points of interest to management men in the Mitchell-Eisenhower speech. Included also was a plea for support on appropriations for mutual aid programs, both military and economic. "No other investment we can make," Mitchell told the more than 900 chemical company delegates in the after-dinner speech that concluded the one-day meeting, "pays greater dividends than a reasonable amount of economic aid."

OTC Entry Bid: Further, Mitchell delivered the President's bid for backing on the Administration's long-standing desire for Congressional approval of U.S. membership in the Organization for Trade Cooperation. He termed OTC "a business-like unit" that would serve as secretariat for the General Agreement on Tariffs and Trade. Various chemical concerns have stood with the American Tariff League in opposition to U.S. participation in both GATT and OTC.

In his prepared address, Mitchell called on chemical industry employers to take the lead in adjusting personnel policies to the changing nature of the work force in this country.

"While the chemical industry is growing faster, and using more quality personnel than industry as a whole, its personnel problems are not

unique," Mitchell said. "Everywhere in America, industry is growing and there is a growing need for skilled, technical and professional workers. Almost all industries are using technical people in greater numbers monthly."

"To an industry that must constantly increase output in order to satisfy the consumer demands of our growing population while maintaining the nation's industrial potential for defense, this situation presents a double challenge. The first part of this challenge, it seems to me, lies in the motivation, education and training of every available person who is suited for a technical career. The second lies in the full and proper utilization of people once they have the necessary background."

Sales Record Sighted: While Mitchell's speech was perhaps the highlight of last week's meeting, management men also found other events of interest.

The six panel discussions on various industry topics (*CW Business Newsletter*, Nov. 30) were well attended throughout the day and provided delegates with new approaches to industry and management problems.

And, as morning panels adjourned, MCA President John Hull told more

than 1,000 delegates gathered for the mid-day luncheon that the industry "may well chalk up a new sales record of close to \$25 billion—perhaps as much as 7% ahead of last year." As relief from the growing profit-cost squeeze, Hull said the MCA tax policy committee has recommended that the association ask Congress "to plan now on how to provide equitable income tax reduction as soon as national defense budgetary requirements will permit."

A speech by Carl Munson, board chairman of Air Reduction Co., followed Hull's report. In a brief review of MCA's progress over the years, Munson told delegates that the association's budget this year will be \$950,140—about 35 times what it was 20 years ago. He said the association is planning to use the money "to develop increasingly effective programs in the fields of public relations, scientific education, and better representation before the executive and legislative branches of the federal and state governments."

Munson explained that a major goal for the stepped-up public relations program would be to spark increased awareness on the part of all citizens of the industry's role in atomic energy and other vital fields.



Texas Gulf's Nelson: Reduced earnings in prospect.

Stockholders Restive

Texas Gulf Sulphur Co.'s stockholder-get-together last week in Houston, Tex., turned out to be anything but a routine annual meeting. In a lengthy question-and-answer session following regular business, Chairman Fred Nelson and his associates were the object of some angry-voiced attacks by stockholders.

Hurling charges of "mismanagement" and "poor planning," stockholders demanded to know why expenses were going up while sales were down, and if the regular stock dividends—recently cut in half—will be further cut.

The shareholders' concern stems from Texas Gulf's lower earnings so far this year. For the third quarter of '57, the company's profits were off 60.6% and its sales down 26.6%. Nelson, in answering heated stockholder queries, held out small hope of improvement this year or next. He predicted '57 sales would be off about 20% and that sulfur shipments would be down about 14%.

Nelson cited labor costs, reduced sulfur prices and the failure of some of the company's recently leased land to come into commercial production as factors contributing to the dim earnings prospect. However, the board chairman reminded shareholders that a company that earned \$13.8 million in after-tax profits on sales of \$52.4 million during the first nine months of '57 (margin: 26.3%) is "far from broke."

High Hopes for Quota Relief

While at the MCA meeting in New York the government was seeking support for relaxing of tariffs, one segment of the chemical process industries—lead and zinc producers—hopefully wound up arguments for greater protection against imports at a formal hearing in Washington.

Even before the Tariff Commission ended its seven-day hearing, producers displayed optimism that some kind of relief—preferably quotas on imports—would be granted. So confident was Eagle-Picher Co. (Cincinnati) that it reopened 10 of the 12 mining locations it had closed down last July. The company confirmed speculation that it resumed these operations because it anticipates lead-zinc tariff relief. Eagle-Picher told *CW* that prospects of favorable action are "very good." A spot-check of other producers revealed similar optimism.

Representatives from almost every domestic producer argued that price

declines and production falloffs are evidencing severe damage to the industry. Charles Schwab, head of the mining industry committee, pointed out that the commission had supported a plea for higher tariffs three years ago, but the White House turned thumbs down. Now, says Schwab, the zinc and lead producers must have relief or the industry will suffer irreparably.

But there is some feeling among veteran Washington tariff experts that the industry's hopes may be premature. While industry spokesmen gave strong arguments for relief, it was pointed out that higher tariffs would be an economic "slap in the face" for three close allies—Mexico, Canada and Peru. There's the feeling, too, that an increase in tariffs could set a precedent for other protection-seeking industries and would conflict with Eisenhower's general policy of liberalizing tariffs.



Union Leader Phillips: His Canadian members are striking over wage gap.

Wanted: U.S. Wages

With negotiations still deadlocked in the 6,000-worker strike against nine pulp and paper mills in western Canada (*CW*, Nov. 23, p. 23), process management in Canada is confronted with an issue that may become troublesome in the next few months: the U.S.-Canada "wage differential."

This issue—based on the fact that nearly all Canadian wage rates are lower than corresponding pay scales in the U.S.—has come to be a sore spot for all Canadian employers, but particularly for those concerns that have operations on both sides of the border. One example: the recent strike by Local 32, International Chemical Workers Union, against the Lever Brothers Ltd. plant at Toronto. The union assailed the Canadian Lever company's wage rates as being 53¢-an-hour lower than those then in effect at plants of the U.S. Lever Brothers concern.

In the current pulp and paper strike, United Papermakers & Paperworkers—headed by Paul Phillips, of Albany, N.Y.—is asserting that most newsprint made in British Columbia by workers receiving \$1.72/hour is sold in the U.S. in competition with U.S. newsprint made by employees whose base pay is \$2.01/hour. Management's reply is that there are "two entirely different economies" in the two nations.

Interhandel Buys Stock

In what was later discounted as a bid to regain control of General Aniline & Film Co., the Swiss firm Interhandel last week signed an agreement to buy the Swiss Industriebank's preferred Interhandel stock holdings. The move was designed to wrest voting control from the bank, which formerly had a major interest in Interhandel.

The deal was also viewed, by some Swiss observers, as a "coup" that sharply raised Interhandel's chances of reacquiring GAF, seized by the U.S. government during World War II as alien property. Justice Dept. officials viewed such speculation as "nonsense."

Justice Dept. sources say that the legal question is not who owns what percentage of whose stock now—but who owned what during the war or when the assets were seized. The department further states that a company formerly German-owned or controlled could not subsequently change owners and thereby establish a claim for return of seized assets as a non-enemy firm under U.S. alien property laws.

Indicted on Suspicion

A study of cancer incidence in Ohio, carried out by state health officials, has found that highly industrialized Cleveland and Cuyahoga County share the lead for number of cancer victims in the state. And residents, alarmed by the report, have again looked to air pollution as a possible cause.

No evidence has been found that fumes from the surrounding factories have anything to do with cancer incidence. But worried residents have asked Pollution Commissioner Leroy Diehl to "explain the relation—if any—between industrial air pollution and cancer."

Diehl, confined to bed with illness since before the report was completed, has been unable to reply publicly. But a spokesman for his department said the report offers "no proof" that air pollution as it now exists constitutes a health hazard.

The study says certain chemical plant workers have a higher-than-average incidence of certain types of cancer—but no link with air pollution is mentioned or implied.

The survey is providing political

ammunition for Casmer Bielen, Democratic ward leader in Ward 13, one of the areas showing heavy cancer concentration. A long-time antipollution man, Bielen says he will agitate for a nonpartisan committee to raise funds, hire a lawyer, study the legal aspects of pollution, and keep the fight alive.

A coauthor of the report—Dr. Thomas Mancuso, of the Ohio Dept. of Health—would go no further than to raise this question: "Are environment factors responsible?"

But the new spurt of antipollution sentiment triggered by the report gives industry management throughout Ohio a cause for concern about the possibility of new and heavily restrictive legislation.

Reshuffle at Allied

Elected last week to succeed Fred Emmerich as chairman of the board of Allied Chemical & Dye Corp. (New York) was Kerby Fisk, who up until a couple of years ago was listed in "Who's Who" solely as an insurance executive.

With Emmerich planning to retire as board chairman at the end of this year, Fisk—54-year-old Harvard graduate who joined Prudential Insurance Co. in 1941 and 10 years later became a vice-president—will become the head of the nation's third-largest chemical concern. His rise at Allied was rapid: director in '55, director and chairman of the executive committee in '56, and now to be added, the chairman-of-the-board title.

Emmerich—an Allied employee and officer since the Barrett-General Chemical-National Aniline-Semet Solvay-Solvay Process merger created the corporation in 1920—will continue to be associated with the company as a director.

Glen Miller, president and chief executive officer, also said that Carlton Bates and Harry Ferguson have been elected to two new executive vice-president posts, and that Chester Brown will move up to a vice-presidential office. Bates—now a vice-president—formerly was president of the company's Solvay Process Division. Ferguson is serving as a vice-president, director, and member of the executive committee. Brown is now president of General Chemical Division.

COMPANIES

Natural Gas Pipeline Co. of America has registered \$40-million in first-mortgage bonds with the Securities & Exchange Commission. The company will offer the bonds for sale to the public through a group of underwriters headed by Dillon, Read & Co. Inc. and Halsey Stuart & Co. Inc. Proceeds will be used to retire \$44.5 million in bank loans.

Texas Pacific Coal & Oil Co. stockholders voted to increase the company's authorized common stock to 5 million shares from the present 3.6 million. Company officials said the new stock will be used to acquire oil and gas properties.

British Canadian Aluminum Co. Ltd. is offering \$5 million in 6 1/4% debentures for sale to the public. The debentures, noncallable for a 10-year-period for refunding at a lower interest, will be sold through underwriters headed by Gundy & Co. Ltd., and Green-shields & Co.

Isotope Products Ltd. (Toronto) stockholders have approved plans to merge with Curtiss-Wright of Canada Ltd. Terms call for parent U.S. Curtiss-Wright Corp. to acquire 3 million shares of Isotope Products in exchange for all the shares of Curtiss-Wright of Canada Ltd. Isotope shareholders also approved an increase in authorized stock from 2 million to 5 million shares to effect the merger.

Union Carbide Corp.'s Electro Metallurgical division will cut back production of titanium at its Ashtabula, O. plant. About 250 workers will be laid off and the plant will continue operating at 25% of capacity. The cutback followed government notification that it would not buy titanium metal after Feb. 4, '58.

Beckman Instruments Inc. shareholders have approved the acquisition of Arnold O. Beckman, Inc. (South Pasadena, Calif.). Terms call for an exchange of 3,477 Arnold O. Beckman shares for 28,500 shares of Beckman Instruments. Total market value: \$34,770.

EXPANSION

Tax Exemptions: Seventy-two companies have filed applications for 10-year tax exemptions for proposed new construction in Louisiana under the state's industry inducement act (see also pp. 59-66). Highlights: Shell Chemical Corp. (Norco, La.) is asking exemption for three new chemical units to produce acrolein, synthetic crude glycerine and methyl ethyl ketone at a total cost of \$12.2 million; Libbey-Owens-Ford Glass Co. is asking for \$5.1-million expansion of its Shreveport window and sheet glass plant; and Crown Zeller-

bach for three additions to its Gaylord division's Bogalusa pulp and paper mill totaling \$4.9 million. Largest application came from Esso Standard Oil Co. (Baton Rouge) for a \$24.7-million plant to make high-octane reformatio used in gasoline.

Lithium: Quebec Lithium Corp. will build a \$3-million lithium processing plant at Rouses Point, N.Y. Scheduled for completion in '59, the new unit will process lithium ore shipped in from the company's mine in northwest Quebec.

Lead-Zinc: This week Eagle-Picher Co. will resume operations at 10 of its lead and zinc mines in Oklahoma, Kansas and Missouri and at its central mill north of Commerce, Okla. Two mines, near Picher, Okla., will remain closed (see p. 33).

Manganese: American Potash & Chemical Corp. will conduct preliminary explorations of manganese ore deposits near Batesville, Ark. If sufficient deposits are proved, American Potash will form a new company—in which it will have a controlling interest—to start commercial production.

Natural Gas: Northern Natural Gas Co. (Omaha) has asked the Federal Power Commission for licenses to build \$6-million facilities. About \$1.5 million of the construction would be started this year, the rest in '58.

Northern Natural covers a five-state area serving parts of Minnesota, Iowa, Nebraska, South Dakota and Kansas.

Cement: St. Lawrence Cement Co. (Clarkson, Ont.) is tentatively planning an \$8-million cement plant near Dundee, Mich. Capacity of the new unit would be 18 million bags/year, one of the largest in the U.S. The plans are contingent upon approval of the company's request that five roads criss-crossing the property be closed.

Water Treatment: Shell Chemical Corp. has started construction of a \$500,000 water purification unit for its Houston, Tex., plant. When completed, in mid-'58, the purifier will use a five-stage treatment process removing all oil, solids and neutralizing chemicals. The water will then be reused to process chemicals.

Steam Generator: Standard Oil Co. of California will add a \$2-million steam generating plant at its El Segundo, Calif., refinery. Installed as part of an existing catalytic cracking unit, the generator will burn natural gas and catalyst regenerator flue gas as fuel. Construction will begin in Aug. '58, should be completed by March '59. Fluor Corp. (Los Angeles) is the contractor.



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CLARITY is but one of scores of desirable characteristics Argus stabilizers and plasticizers can impart to your vinyl resins. Argus *Mark M* and *Mark PL*—free of the soapy material present in ordinary stabilizers that make vinyl hazy—are responsible for the window-glass clarity of this umbrella cover.

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Washington Newsletter

CHEMICAL WEEK
December 7, 1957

A looser rein on defense spending is an even better bet as a result of the President's illness. That's the consensus of observers measuring the likely impact of the President's latest disability. Timing and personality differences figure in their appraisal. Eisenhower's withdrawal from active participation in day-to-day budget planning—even for a brief period—will give more scope in interim spending decisions to Vice-President Nixon; and, Nixon has been notably less cautious than his boss about increasing military spending to counter the Sputniks. December is the time the White House must settle on the final budget figures it will submit to Congress next month for the year ending June 30, '59.

To be sure, Eisenhower himself, before his illness, signaled the switch toward freer defense spending. But it took weeks for him to reach that decision, reversing his earlier post-Sputnik stand against such increases. And, in lifting the lid on missiles and basic research spending, he stressed the need to offset some of the hikes by cuts in other projects.

Nixon, however, was a prime mover in the Administration's eventual policy reversal. Shrewdly assessing public reaction, he openly took issue from the start with the Administration's soft-pedaling of Sputnik's challenge to non-Communist nations' defenses.

Defense Secretary McElroy is for bigger spending, too. He's on record—as is Nixon—as an enthusiastic booster of basic research. Professional military officers count on finding more sympathy for their spending pleas than they got from ex-Secretary Wilson (who—the professionals complain—bowed too readily to the Treasury's budget-balancing demands). And, because of the disruption of his direct line to our soldier-president, McElroy is expected to lean more heavily for counsel on the professional military men.

Some important decisions have already been made. The Pentagon plans to boost its basic scientific research spending from almost \$85 million this year to about double this amount in fiscal '59. The Thor and Jupiter ballistic missiles will be put into production. Both 1,500-mile missiles use the North American Aviation Rocketdyne liquid-fuel rocket engine, producing a rated thrust of about 135,000 lbs.

Don't look for a detailed rundown on '58's military spending in the budget report to Congress in January. The report will show by broad categories how the Pentagon plans to spend the money; and, to be sure, some details will be included. But the big decisions on spending increases will be made next fall—when the Pentagon's controller and the Budget Bureau go through the so-called "apportionment" process—earmarking (from the appropriations voted by Congress) specific amounts to each service for specific contract awards. Earlier indications of the shape of Pentagon spending will come during appropriations hearings before

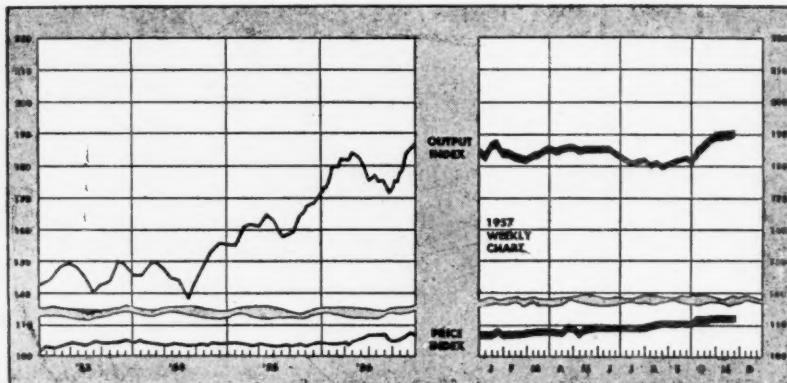
Washington Newsletter

(Continued)

Congressional committees; there, Defense officials will outline major projects, based on preliminary decisions on such matters as production plans for long-range ballistic missiles.

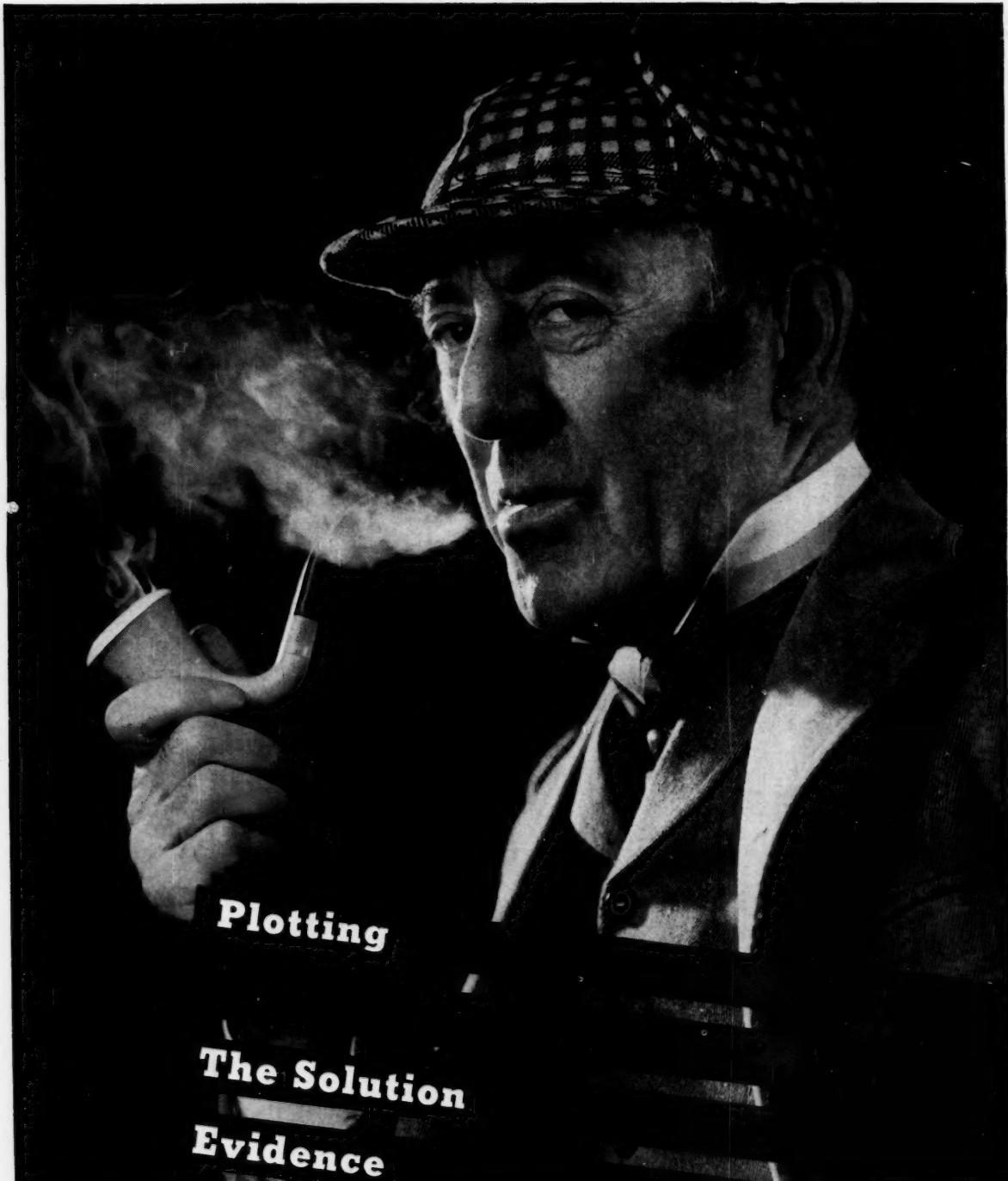
Major foreign policy issues are piling up fast. Nixon will help in the fight for the Administration's foreign- and military-aid programs in Congress. But, neither he nor Secretary of State Dulles can fill Eisenhower's shoes when it comes to restoring confidence in the U.S. among our North Atlantic Treaty allies—and the uncommitted countries. Eisenhower's prestige among Europeans remains high. Dulles, on the other hand, is regarded with suspicion abroad, and Nixon's reputed anticolonial views are anathema to many Europeans.

Key problems requiring hard decisions soon: (1) Soviet penetration of the Middle East, Western Europe's major source of oil (the West is divided on policy toward the Moslem world, and the "Eisenhower Doctrine" is unpopular in most Near Eastern countries); (2) how much foreign aid to seek from Congress, particularly for India, which is rapidly going bankrupt trying to finance its ambitious second five-year plan. France, too, may soon ask the U.S. for some \$500 million in financial aid—such a request will require delicate handling; (3) the reciprocal trade agreements program comes up for renewal June 30; the Administration, facing a bitter battle in Congress, may strike out boldly—seeking a five-year extension (instead of the three-year extension voted in '55) and further tariff-cutting powers.



Business Indicators

	Latest Week	Preceding Week	Year Ago
WEEKLY			
Chemical Week output index (1947-49=100)	188	190	184.5
Chemical Week wholesale price index (1947=100)	111.2	111.2	106.9
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	40.17	38.83	41.55
MONTHLY			
Wholesale Prices (Index 1947-1949=100)			
All commodities (other than farm and foods)	125.7	126.0	123.6
Chemicals and allied products	110.4	110.2	107.7
Industrial chemicals	123.6	123.5	122.6



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RESEARCH



Senior architect partners Walker and Haines blend beauty and economy in new lab construction.

Architects' Pointers Pare Building Costs

New research laboratories frequently bear \$2-million-and-up price tags, but some provide more value than others for the same money. The difference can lie in experienced, thoughtful planning. That's why research directors, often called on to estimate future laboratory needs, are finding lab architecture specialists increasingly useful allies.

This week, *CW* asked several of those architects and builders for cost-saving tips on laboratory construction, early-planning pointers that can ward off expensive mistakes. The consensus: don't be stampeded (by top management) into hasty estimates or land purchase—the results can prove embarrassing.

Setting on a Site: Savings start with a prudent choice of location for the new lab. Research directors, designers say, tend to underestimate ultimate building costs, overestimate space requirements. One rule of thumb is that land for original construction plus expansion should cost only 10-15% of

the cost of the initial structure. Poor site selection can raise this ratio appreciably.

Specialists also warn lab directors to keep the ultimate number of laboratory personnel in mind when picking a site, then be sure to figure in heat, power, water and sewage requirements. (One new laboratory is costing \$175,000 extra because of sewage disposal problems that were not fully anticipated.)

Charles Haines, senior partner in Voorhees, Walker, Smith & Smith (New York), architects, believes "the appalling consumption of land for automobile parking" is one reason for the current practice of acquiring large building sites. Companies having about 100 researchers, he says, commonly acquire rural sites in excess of 200 acres. But he cautions that these locations may require substantial investments in utilities. More urban land, with sewer and water at street frontage, frequently costs \$30,000 to \$40,000/acre, while country sites seldom

exceed \$1,000/acre. Site development costs, Haines concludes, may easily be justified in many cases.

Buy for Expansion: Land is still considered to be plentiful and cheap, and builders recommend purchase of at least enough for a subsequent 100% building expansion. More expensive flat land, they point out, isn't necessary for a research lab—more important considerations are the site's proximity to town and university facilities, roads and suitable homes for personnel.

Planning the Building: All laboratories, of course, differ in some respect or other. But today they generally cost about \$35-40/sq. ft. That includes construction cost (see table, p. 48) plus \$4-7/sq. ft. occupancy costs (benches, hoods, sinks, etc.). The trend is to build laboratories containing at least 50,000 sq. ft., costing about \$2 million without extras. The latter — parking lots, landscaping, soundproofing, special humidity or temperature-controlled rooms, radia-

Life on the Chemical Newsfront

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(Plastics and Resins Division)

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(New Product Development Department)



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(Organic Chemicals Division)

ESSENTIAL TO BODY CELL PRODUCTION, folic acid is receiving increased attention as a nutritional supplement. Deficiencies lead to certain types of anemia—a danger particularly present during the highly increased cell production of pregnancy. Prenatal diets often call for folic acid in supplemental form to avoid blood abnormalities in both mother and child. Found in liver, yeast and leafy vegetables, folic acid is manufactured by Cyanamid for professional use and for the manufacture of multivitamin preparations.

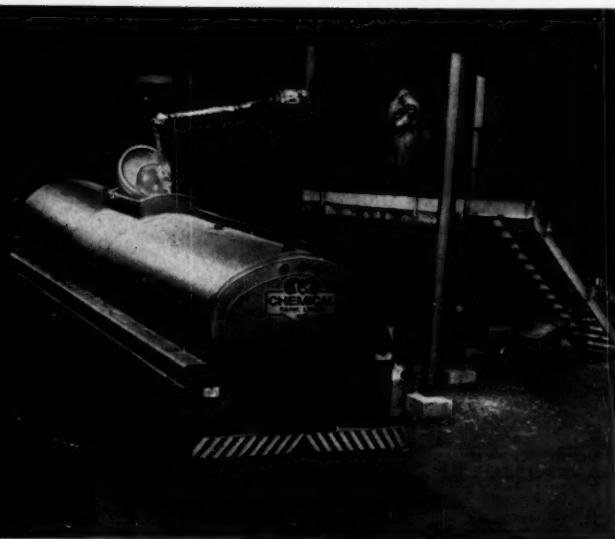
(Fine Chemicals Division)



THE APPLICATION OF NEW FLUID CATALYST TECHNIQUES to production of phthalic anhydride is well under way at Bridgeville, Pa. This new plant has increased Cyanamid's production capacity for AERO* phthalic anhydride and is yielding an extremely pure grade that is evident from the unusual whiteness of the flakes and the brilliant clarity of the molten material. This new product quality is presented in the recently published Cyanamid "P.A." specification and typical properties.

(Industrial Chemicals and Plastics and Resins Divisions)

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December 7, 1957 • Chemical Week

Why Laboratories Cost More to Build

	% Cost Change 1952-57
Lab Equipment	+12-15
Plumbing, drainage and service piping	+25
Heating, ventilation and air conditioning	+33
Electric, light and power installation	+20
Sitework, roads, parking and landscaping	+10
Excavation	
Hand	+50
Machine	+20
Exterior walls	
Masonry, sash and glass	+12
Curtain—steel frame and glass	-15
Curtain—aluminum frame and glass	-15
Interior partitions	
Structural glazed tile	+15
Concrete block	+14
Metal partitions	+25
Plaster on metal lath	+9
Ceramic tile	+15
Structural framing	
Steel	+20
Reinforced concrete	+15
Floors	
Concrete topping	+11
Ceramic tile	+14
Vinyl tile	+7
Asphalt tile	+10
Quarry tile	+10
Painting	+25
Roofing	
Gypsum roof plank	+12
Concrete roof plank	+10
Metal	+9.5
Ceiling	
Plaster on metal lath	+11
Acoustic tile	+10
Metal pan	+10

tion laboratories—can be expensive.

Good designing won't necessarily lower this price, but it can get you more for your dollar. Ralph Walker, also a senior partner in Voorhees, Walker, Smith & Smith, stresses modular building as one route to such savings. Modular building involves repetition of the design of individual laboratories, yields lowered first cost. It also retards obsolescence by permitting the entire interior of a building to be economically rearranged at a later date.

For greater economy, the experts also advise:

- Build low. Two stories are often an optimum height because they eliminate the need for personnel elevators, permit rest rooms to be shared by occupants of both floors, and are generally more economical.

- Build as few specialized rooms as possible; consider using special booths instead. A 12x15-ft. room to simulate both desert and arctic conditions may cost \$80,000.

- Don't have wide expanses of

windows. A window area comprising 25% of the outer wall surface provides sufficient working light.

- Orient the building to avoid sunlight glare; keep outside walls cool in summer.

Materials: Experienced lab builders such as H. K. Ferguson & Co. (New York) and Wigton-Abbott Corp. (Plainfield, N.J.) have acquired a broad grasp of the savings inherent in proper choice of laboratory building materials. Materials costs (see table, left) have plainly risen, but not uniformly; thus, cost-saving substitutions may be possible. Incidentally, such substitutions needn't necessarily detract from a laboratory's outside appearance. Ralph Lamie, of H. K. Ferguson, explains that the extra cost of improving a laboratory's appearance can be a relatively small share of the entire building cost—and be amply justified when the lab's impression on the public is considered.

It isn't necessary to plaster walls and ceilings in most laboratories; paint is less costly and quite satisfactory in most cases. Flooring should be chosen according to the work to be done in the lab. Plain concrete may suffice, or the generally favored vinyl asbestos tile may be used.

For outer construction, aluminum or glass may have a cost-edge over heavy masonry or marble. The lab's desired appearance, of course, will govern this choice.

Monsanto used a novel approach to laboratory construction by including more than 80 plastics in new research quarters for its inorganic chemicals division. The cost of this brand-new lab, says Monsanto, compares "favorably" to standard installations. In some cases (plastic curtain walls vs. porcelain steel), the cost was more than competitive. No mere showcase, the lab was designed to show the practicability of using plastics in lab construction.

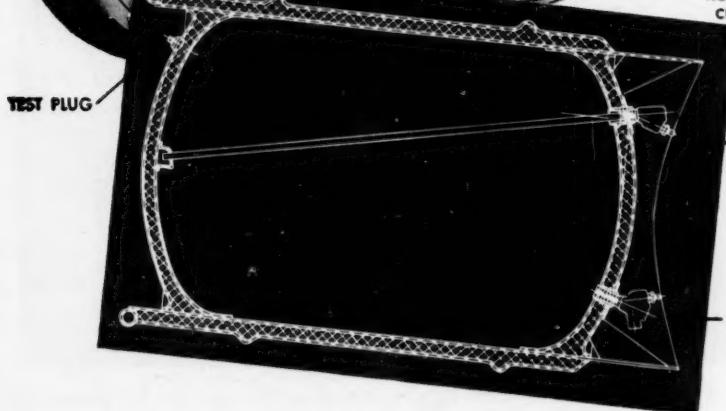
Three Rules for Use: According to Col. Herbert Tumin (U.S.A., ret.), of Monsanto's research and engineering department, three yardsticks were used in picking the plastics:

- (1) If the plastic material was approximately the same cost as a conventional building material, it would be used.

- (2) If the plastic material cost approximately twice as much but featured superior quality or the possibility

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RESEARCH



Ferguson's design team* notes public's reaction to handsome labs.

of reduced cost in the future (because of improved production methods), it would be used.

(3) If the material cost three times as much as its conventional competitor but "opened new usages heretofore not demonstrated" and otherwise fulfilled the requirements of point two, it would be "well considered for usage" in construction projects.

*Ralph Lamie, A. F. Ventura, James D. Wolcott.

Under the first consideration, Monsanto picked floor and wall coverings, drapes, furniture upholstery, etc. Under the second, came polyester face blocks for exterior surface and paving stone; polyester-coated asbestos cement board for laboratory bench tops; polyester panels for lining fume hoods; and urethane coatings for concrete floors. Qualifying in the third classification were styrene core, polyester-faced wall panels, polyester exhaust



Walker, Haines use models to save construction dollars for research.

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Plants in: Clifton, N.J., Carteret, N.J., Los Angeles, Calif.

RESEARCH

Laboratory Construction Costs

(Includes building, utilities, corridor walls, doors, etc.)

Area	Cost/sq. ft 1952	1957
New York	\$23.50	\$28.00
Los Angeles	\$21.50	\$25.50
Chicago	\$21.50	\$25.50
Dallas	\$21.00	\$23.00

fans and polyester molded drawers. Over \$30,000, exclusive of Monsanto personnel's time, was spent for such tests.

Not all Monsanto's plastic substitutes were successful, however. Styrene foam roof insulation cost 86¢/sq. ft., compared with glass-fiber insulation at 40¢/sq. ft. The styrene insulation not only cost more than twice as

much but also was fragile, hard to apply, needed a special adhesive. Says a Monsanto project construction engineer, "We hope that it will never be seen again on this installation."

Not Just Money: There's much more to designing a laboratory, of course, than figuring materials costs. To attract and hold personnel, the lab must be styled for comfort as well as esthetic



Seeking Fallout Effect on Farm Land

Radiation research chemists (above) are using strontium-89 (half life: 54 days) to determine the damage created by strontium-90 (half life: 28 years) on farm land. They're trying to answer three main questions: How soon can we eat produce from fields contaminated by fallout from nuclear explosions? How can a field be brought back to

use more quickly? How much contamination finds its way into crops?

This work, at the British Agricultural Research Council field station (Compton, Berkshire, England), has been spurred by the recent Windscale incident (CW, Nov. 2, p. 22), which exposed a large area of the countryside to radioactive iodine-131 particles.

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RESEARCH

appeal. Thus, air conditioning, though expensive, may more than pay its way. And the costs of colored tile, bright paint and comfortable chairs aren't usually prohibitive.

Incidentally, according to Ralph Lamie, sprinkler systems are obsolescent in labs, are being replaced by hand-operated fire-fighting equipment, hose cabinets in corridors. Sprinklers are still generally preferred in administration buildings, however.

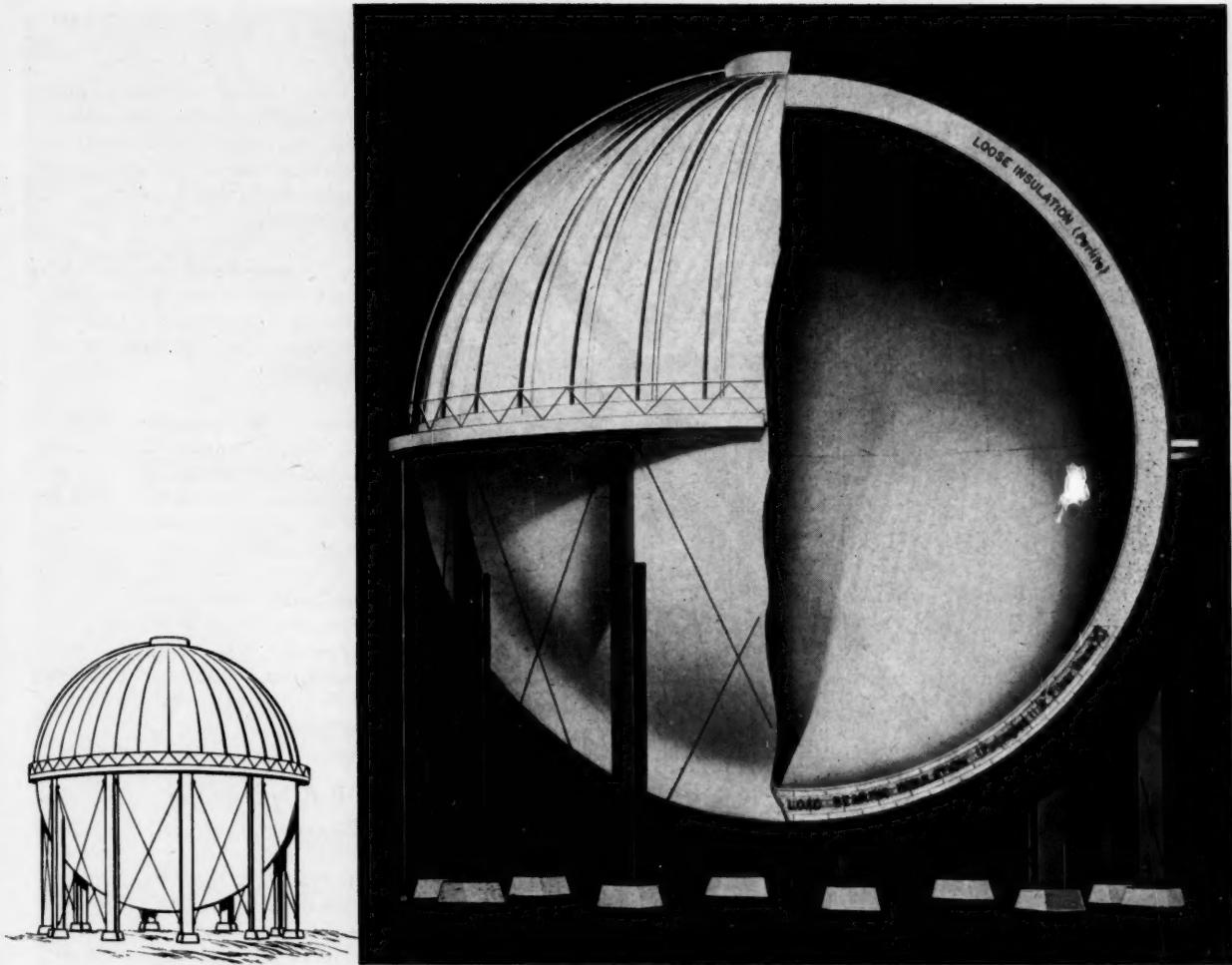
It's necessary to remember, too, that improper choice of building materials can mean false economy. Relates Haines, "In recent years, there has been a recognition that rapid obsolescence causes a greater waste of the research dollar than can ever be attributed to high initial construction cost. In 1949-54, we saw management resort to use of materials that were cheap in first cost regardless of their maintenance or operating characteristics. Such an attitude was readily understandable because these people had just experienced the rapid postwar inflation. Now, however, these cheap buildings are beginning to show signs of deterioration. It is unfortunate, but true, that poor planning was frequently associated with shoddy construction. The harvest resulting from the seeds of expediency is beginning to be reaped in the form of increased operating cost." Haines adds, quoting Elizabethan writer Sir Henry Watten, a building should have "firmness, commodity and delight." Of these, claims Haines, "is woven the fabric of architecture."

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Alkyl Boric Acids: Three new alkyl boric acids (alkyl, dihydroxy, boranes) are now available from Callery Chemical Co. (Pittsburgh). They are chloropropylidihydroxyborane, dihydroxynonylborane and dihydroxydodecylborane. They have bacteriostatic and fungistatic properties, also have been suggested for uses in detergents.

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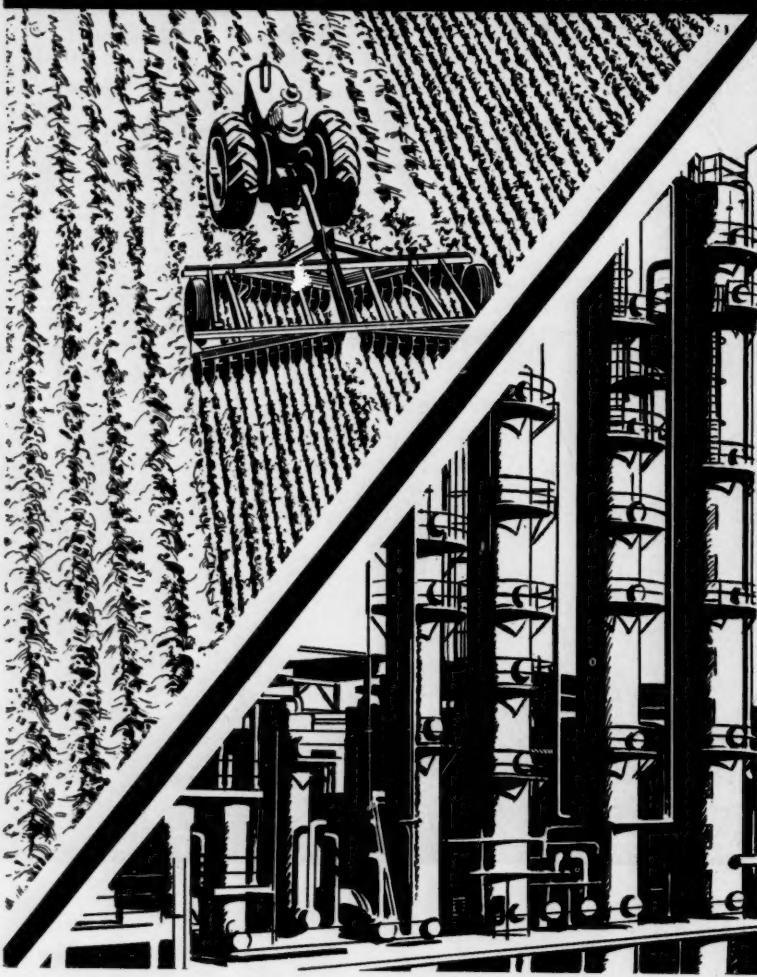
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RESEARCH

tree bark, is now available in pilot-plant quantities from Weyerhaeuser Timber Co. (Longview, Wash.). It's suggested for use in pharmaceuticals and antioxidants, and as a yellow dye, or a chemical intermediate.

For Cyanate Reactions: For reaction with diisocyanates, Rubber Corp. of America (Hicksville, N.Y.) now offers Polyester F-1, a modified glycol-polyadipate.

Amino Acid Separator: Acylase I, an enzyme available in research quantities from Armour & Co.'s research division (Chicago), is said to lower the cost of separating synthetic DL-amino acids.

High-Purity Aluminum: United Mineral and Chemical Corp. (New York) is out with practically pure aluminum that features high ductility, and light-reflecting power with chemical stability.

EXPANSION

• Chas. Pfizer & Co. (Brooklyn, N.Y.) will build a new research building at Groton, Conn., for chemical and biochemical research. The lab, scheduled for completion late in '59, is part of a \$50-million company expansion.

• Firestone Tire & Rubber Co. has purchased a government synthetic rubber pilot plant and laboratory adjacent to its headquarters in Akron, O.

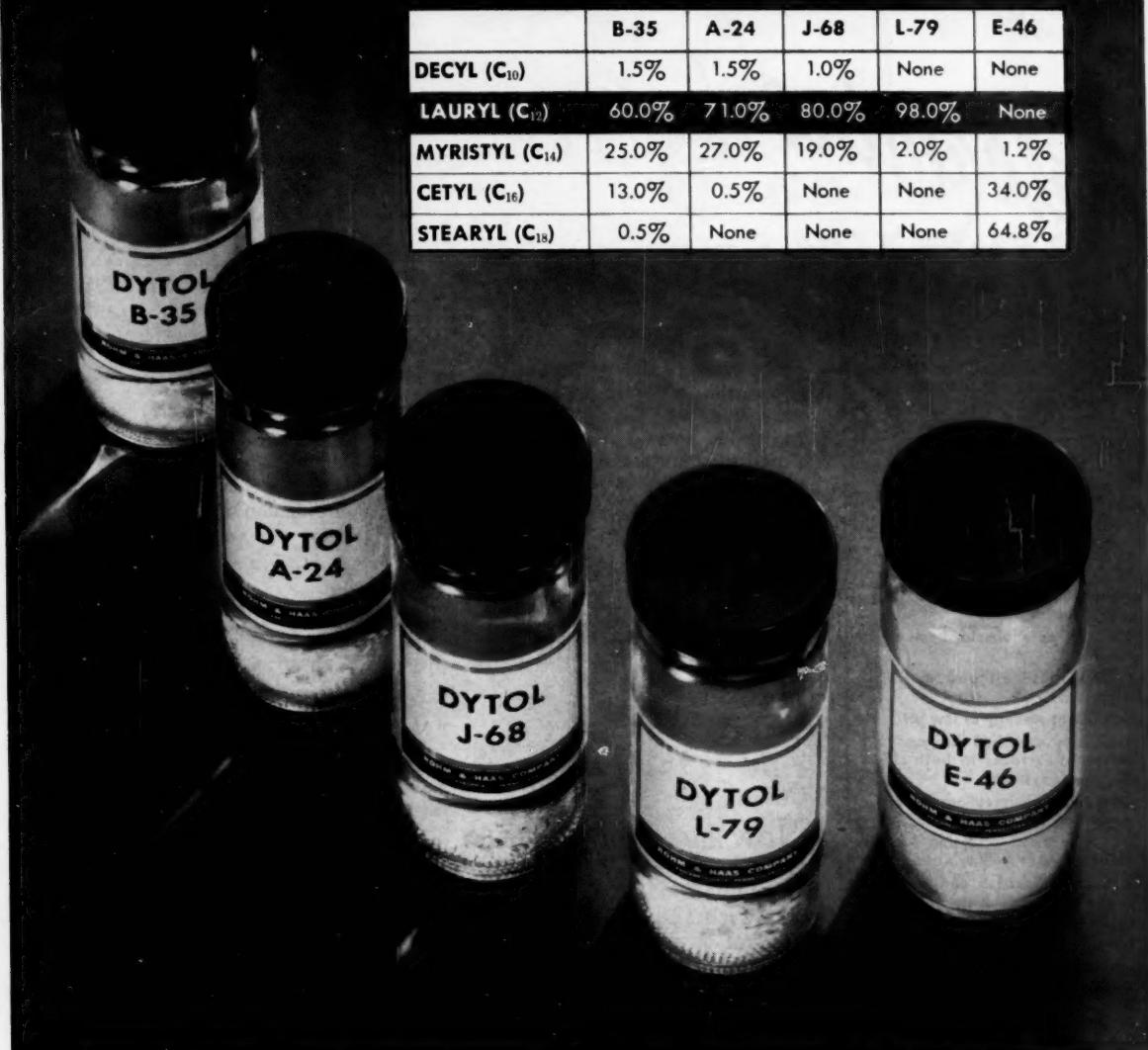
• United Kingdom Atomic Energy Authority has started construction of a \$56-million basic research center at Winfrith Heath, Dorset, England. General Electric will build one of the first experimental reactors slated for the new center. The reactor will burn a mixture of thorium and U-233, cost about \$5.6 million.

LITERATURE

• New price list for carbon-14-labeled compounds available from Research Specialties Co. (Berkeley, Calif.) includes newly released compounds such as purines and pyrimidines.

• A comprehensive discussion of all phases of personnel and community protection against atomic radiation, including topics such as training, use of film badges, site evaluation and in-

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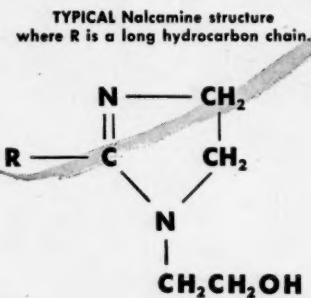
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RESEARCH

strumentation, is available in pamphlet form from Tracerlab, Inc. (Waltham, Mass.).

- Specifications and prices of more than 1,500 compounds, mainly biochemicals, are listed in Mann Research Laboratories Inc.'s (New York) new Reference Guide No. 123.

- "The Industrial pH Handbook," an 80-page manual, reviews industrial pH control systems, their principles, application engineering and equipment. It's offered by Beckman Process Instruments Division (Fullerton, Calif.). Price: \$2.

- A technical-data report on isobutyronitrile is available on request from Eastman Chemical Products, Inc. (Kingsport, Tenn.). The report includes specifications, properties and a number of basic reactions, such as hydrolysis, reduction, oxidation and the formation of amidines, hexahydrotriazine and ketones.

REPORTS

The following research reports are now available from the Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.:

- The tensile strength and elongation of polyethylene are generally not seriously affected by contact with rubber compositions, according to "Effects of Rubber Compositions, Rubber Chemicals and Plasticizers upon Polyethylene" (PB 131091, 19 pages, 50¢). However, adverse effects occur when the rubber formulations contain hydrocarbon or ester plasticizers, which "bleed" to the surface, the report states.

- Plans for an Air Force-designed cobalt-60 irradiation facility, capable of handling a 100,000-curie source, are included in "Design of a High-Intensity Gamma Irradiation Facility" (PB 131160, 54 pages, \$1.50). The design is for an underground facility shielded mostly by earth, features a closed-circuit TV system.

- "Nontechnical Progress Report on Radiation Preservation of Food" (PB 131171, 17 pages, 50¢) is designed to serve business management as a guide to radiation preservation of food techniques. Discussed in the volume are principal features of the process and obstacles to its utilization.

- In recent Navy research, polyvinyl methyl ether and mixtures of the ether with a variety of powdered

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POTATOES get no mashing bumps from this speedy harvester, thanks to Geon polyvinyl materials. Chain conveyors, wheel elevator and buckets, and clod eliminator are all coated with a foaming type plastisol with an extremely tough skin—give perishables a bruise-free ride and help cushion shock at transfer points.

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Get technical information on Geon polyvinyl materials. Write Dept. FF-10, B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

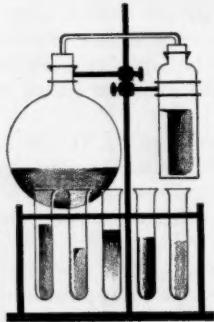


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not bubbles—
gets a start
in these
soap and
water tanks
by BOARDMAN**



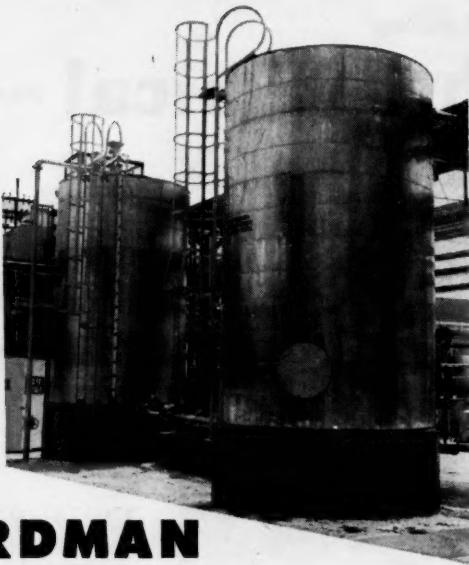
These 10,000-gallon tanks at the Port Neches, Texas plant of the Texas-U. S. Chemical Company contain the emulsifying agents used in manufacturing a superior, general purpose type of synthetic rubber. Each tank is 10'x17', and after installation, was jacketed with aluminum insulation. The BOARDMAN-built tanks were fabricated to the customer's exact specification.

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RESEARCH

fillers were irradiated with electrons from a Van de Graaff accelerator and gamma rays from cobalt-60. Although the ether cross-linked, fillers were necessary to give products with significant strength. Chemical methods of cross-linking, or vulcanization, were ineffective. The research is described in "The Irradiation of Polyvinyl Methyl Ether with Electrons and Gamma Rays to Form Elastomers" (PB 131003, \$1.).

- Three new Atomic Energy Commission reports of research on raw materials, feed materials, radioactive waste and radiation effects on raw and feed materials are offered: ORNL-2366 (30 pages, \$1); ORNL-2380 (36 pages, \$1); and NLCO-677 (16 pages, 75¢).

- "Dynamic Properties of Solids, Final Report" (PB 121701, \$3) concerns research on the elastic modulus and the internal friction of solids under alternating stresses, includes measurements on metals (mostly single crystals) and measurements on plastics and elastomers.

- A special device, used in Naval research on barium titanate, is described in "A Differential Thermal Analysis Apparatus for Temperatures Up to 1575 C" (PB 121999, 50¢).

APPARATUS

Office Irradiator: For radiation research, there's a new unit called the Hotrodder that requires no special shielded room, no auxiliary radiation monitoring or alarm systems, no remote handling or other special equipment. Developed by Nuclear Systems, a division of Budd Co. (Philadelphia), the unit utilizes radioactive cobalt, is made of heavy stainless steel plate filled with pure, void-free lead. According to Budd, the Hotrodder can be safely used in an office or laboratory. It can safely contain up to 25,000 curies of cobalt-60, handle a sample for irradiation up to 10 in. in diameter and length.

The sample to be irradiated is placed on a tray in front of a large, electrically driven, lead-filled block. By pushing a button on the control console, the operator moves the sample into the irradiation chamber, which automatically locks itself. Irradiation occurs during a preset time cycle ranging from 1 minute to 120 hours.

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Typical Properties

PANASOL	AN-1	AN-3
Distillation, °F., ASTM D158		
IBP, °F.	396	446
FBP, °F.	490	540
Specific Gravity, 60/60° F.	0.961	0.995
Aromatics, Vol. %	95	99
Mixed Aniline Point, °F.	62	52
Flash Point, COC., °F.	190	235
Copper Strip Corrosion	Pass	

Solubility*

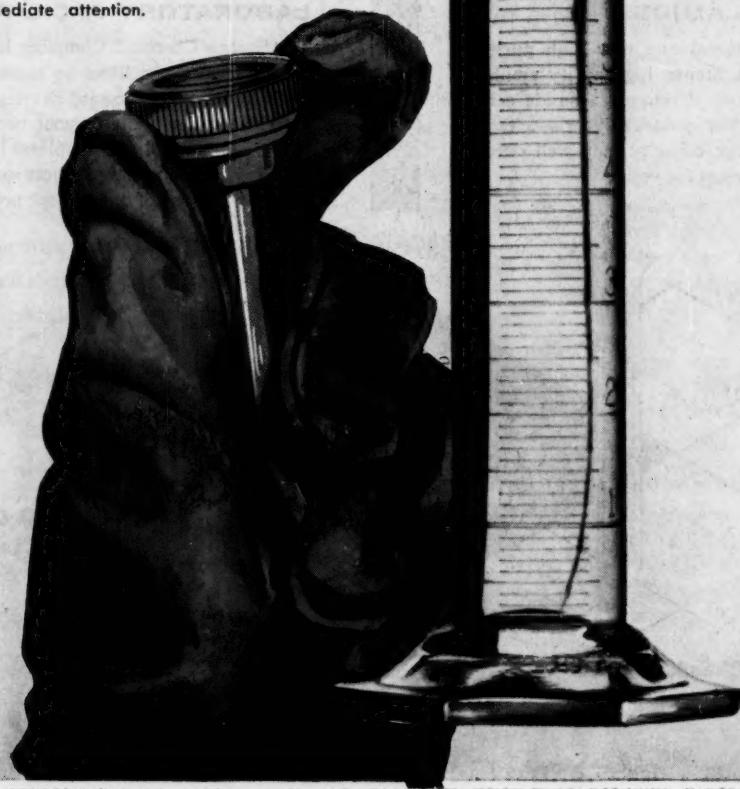
	AN-1	AN-3
DDT (tech.)	39	43
BHC (tech.)	29	31
Lindane	9	14
Dieldrin	26	27

*Wt. parts in 100 parts solution at 32° F.

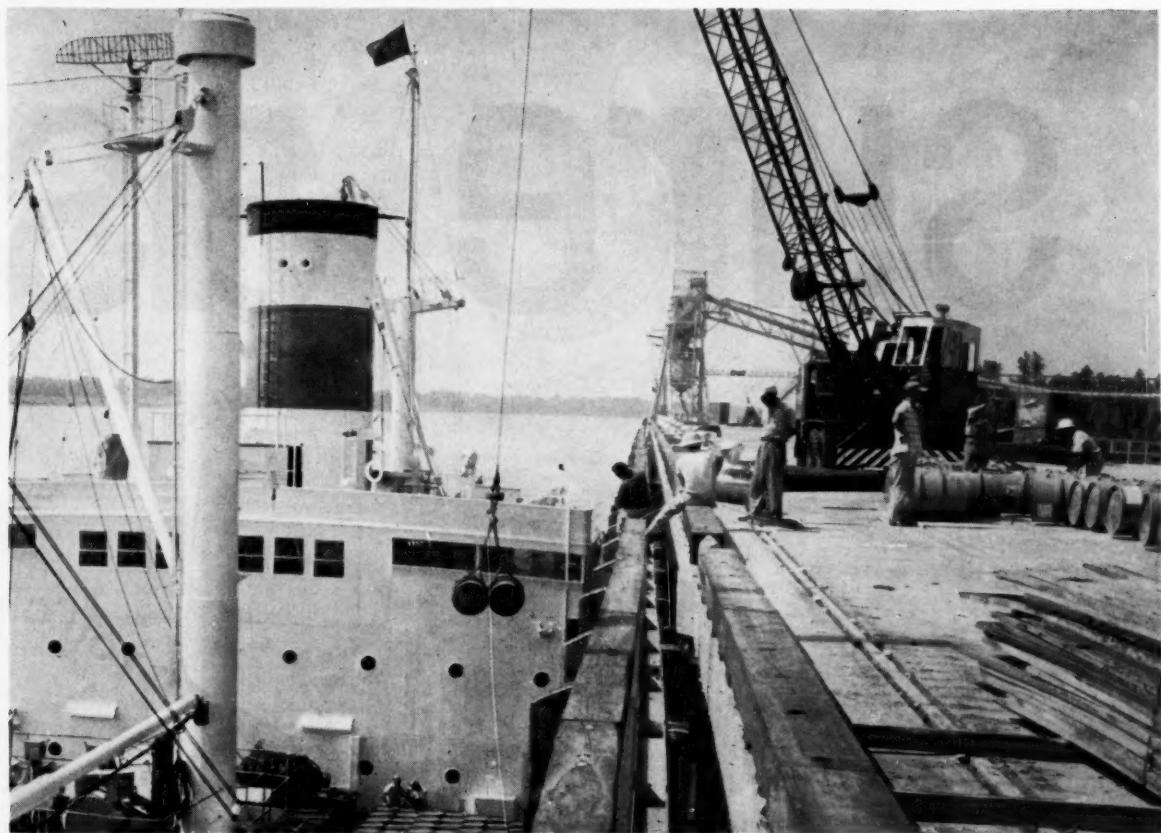
Your request for prices, samples and shipping information will receive immediate attention.

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ADMINISTRATION



River transport, much of it on the Mississippi, is a big Louisiana drawing card. It's one . . .

Wellspring of Louisiana's Chemical Boom

For the CPI, Louisiana ranks tops in popularity for growth; indeed, of the 48 states, only Texas lists more plans for construction of chemical facilities during the two-year period, 1957-58. And the boom isn't slackening, as evidenced by the latest rulings on tax exemption applications for more than \$74 million in chemical processing expansion.

In these two years, chemical firms are building, or plan to build, more than \$350 million worth of facilities, at sites in every sector of the state. Moreover, Louisiana ranks 13th, according to the Manufacturing Chemists' Assn., among chemical manufacturing states; and this year, its chemical and allied products firms employed an average of 18,000 workers. Latest figures for value added by manufacture of chemicals and allied

products show \$251.4 million for '54, more than twice the \$113.5 million figure for '47, and nearly nine times the \$29.7 million of '39.

Growth Factors: No single factor is alone responsible for the Pelican State's remarkable growth in chemical processing. Many factors, including wide availability of labor, proximity to cheap water transportation, central-south location, rail facilities (*map*, p. 62) and fair climate, play a part in its selection. And the state is rich in sulfur and salt, basic chemical commodities.

But contributing most are two of the state's greatest assets: relatively limitless supply of oil and natural gas, and easily obtainable process water.

The great oil and gas pockets of both Louisiana and Texas, coupled with an extensive pipeline network,

plus incoming water shipments of foreign crude oils, make access to petrochemical raw materials an easy matter in Louisiana. And as a consequence, petroleum processing constitutes the lion's share of chemical growth there.

Water availability, too, is a major drawing card for firms considering expansion in the South. Aside from the obvious advantages of "Old Man River"—the Mississippi—the state has such well known water resources as the Red and Black rivers, Calcasieu Lake (near Lake Charles), Sabine Lake, the two Grand lakes, Lake Pontchartrain, and numerous other well springs. It has been estimated that 7,409 sq. miles of Louisiana's land is under water.

At Baton Rouge, 130-odd river miles above New Orleans, the daily

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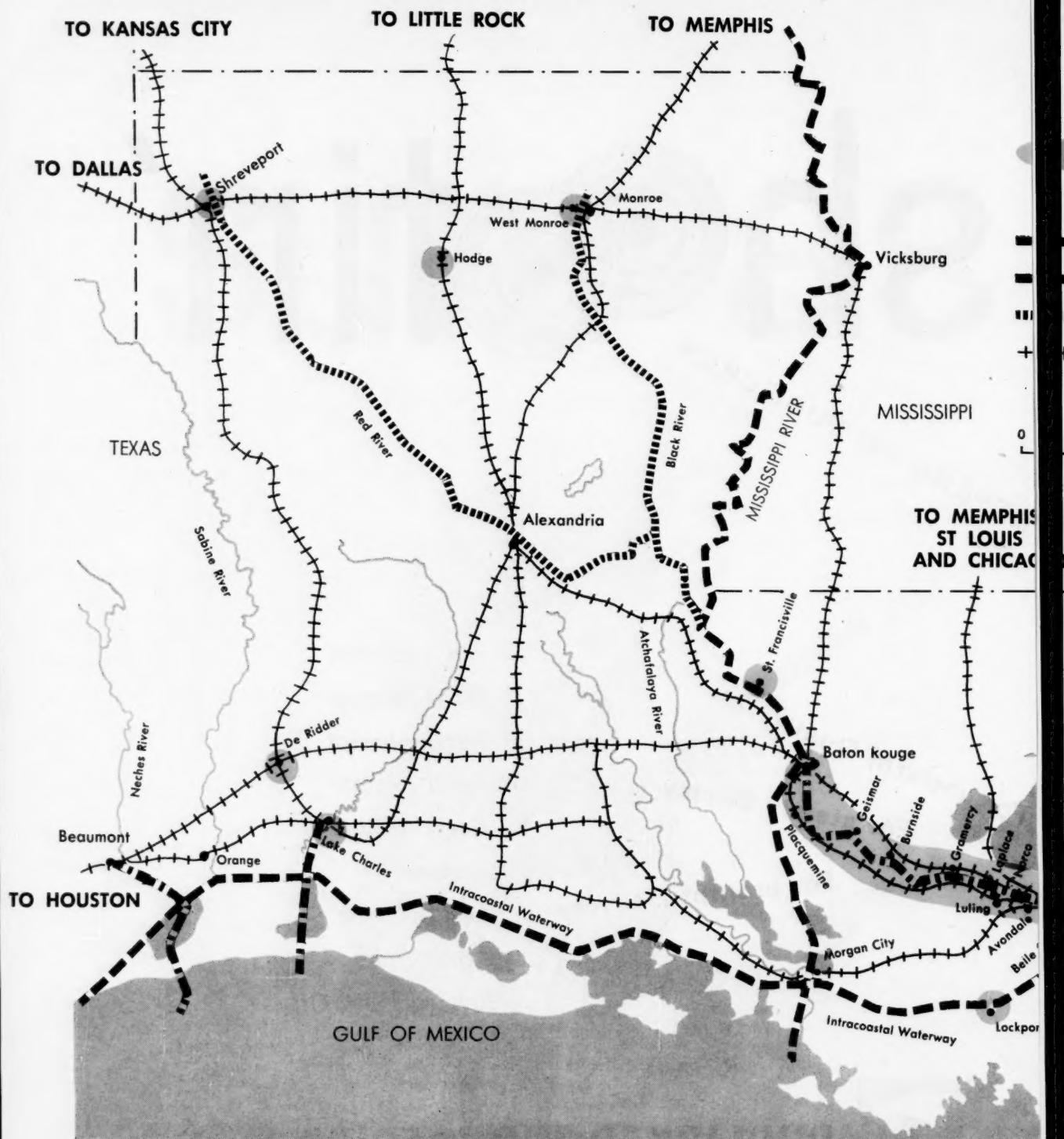
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Acetone
Acetaldehyde
Acetic Acid
Refined Fusel Oil



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water flow of the Mississippi amounts to 300 billion gal.; and elsewhere, ground water is easy to find.

Chemical Roster: The list of chemical and process companies that have migrated to this bastion of the Mississippi is large, about 100; and nearly one-third of these are undergoing

major expansions (*table, p. 63*). Basic groups of the varied facilities:

- Refineries, such as those of Esso and Shell, which make a variety of fuels and lubricants and produce "building block" chemicals such as ethylene.
- Ethylene users, including Ethyl,

Foster Grant, Grace and Wyandotte, which buy from the refineries and natural gas processors.

- Chlorine-alkali plants processing salt.
- Synthetic rubber works, e.g., Esso, U. S. Rubber and Copolymer Corp.
- Acid makers, which supply the

**Areas in which
chemical process firms
are expanding**

Deepwater channels

Barge channels

Barge channels authorized

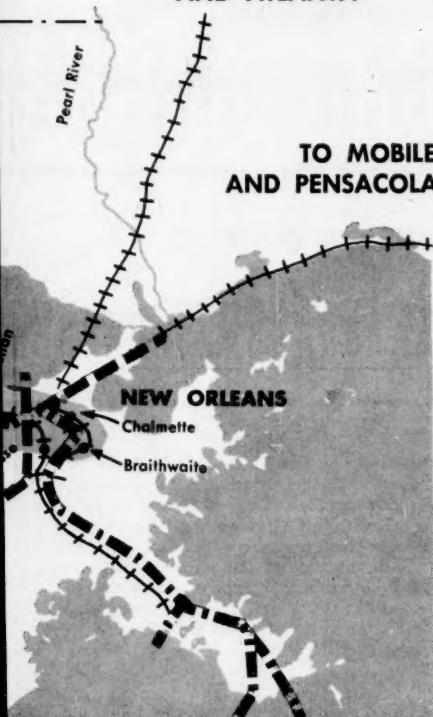
Principal railroads

Scale of miles

20 40 60 80 100

**TO BIRMINGHAM,
CHATTANOOGA
AND ATLANTA**

**TO MOBILE
AND PENSACOLA**



refineries and other chemical makers, such as Stauffer, Allied Chemical.

- Natural gas feedstock users, such as American Cyanamid, Monsanto.
- Aluminum plants, which find natural gas an economical fuel source for their giant power requirements, and seek proximity to cheap water

LOUISIANA'S CPI GROWTH

(Principal expansion projects, 1956-58)

City or town	Company	Principal products	Cost/Completion data
Avondale	American Cyanamid	Acrylonitrile	\$25 million; mid-'58
Baton Rouge	Copolymer Rubber	Butadiene, GR-S	\$5 million
" "	Ethyl Corp.	Vinyl chloride monomer	Late '57
" "	Foster Grant Co.	Styrene monomer	\$1.7 million
" "	W. R. Grace & Co.	Polyethylene	\$20 million; Dec. '57
" "	Standard Oil (N.J.)	Petrochemicals	\$40 million
" "	U. S. Rubber Co.	Synthetic rubber, plastics	\$7 million; Dec. '57
Belle Chasse	Standard Oil (Calif.)	Oil additives	\$1.2 million
Braithwaite	Freeport Sulphur Co.	Nickel, cobalt	\$100 million
Burnside	Olin Revere Metals	Alumina, aluminum	\$51 million; '58
Chalmette	Kaiser Aluminum	Aluminum	\$23 million
De Ridder	Crown Zellerbach	Pulp and paper	Site acquired
Destrehan	American Oil Co.	Petroleum products	
Geismar	Wyandotte Chemicals	Chlorine, caustic soda, ethylene oxide and glycol	\$30 million; '58
Gramercy	Kaiser Aluminum	Alumina, chlorine	\$60 million; '58
Hodge	Southern Advance	Kraft paper	\$11.5 million; '56
Lake Charles	Calcasieu Chemical	Ethylene glycol	\$11 million; '58
" "	Columbia-Southern	Chlorine, caustic	\$2 million
" "	Firestone Tire & Rubber Co.	Synthetic rubber, butadiene	'58
" "	Lake Charles Chemical Co.	Petroleum coke	\$6.2 million
" "	Olin Mathieson Chemical Corp.	Ammonia, nitric acid, sodium nitrate, hydrazine	
" "	Petroleum Chemicals, Inc.	Ammonia, butyl rubber, ethylene, butadiene	1956-58
Laplace	Du Pont	(not available)	Site acquired
Lockport	Valentine Pulp & Paper Co.	Paper	\$15 million; 1956-57
Luling	Monsanto Chemical	Adipic acid	\$2.4 million; '56
New Orleans	Chemoil Corp.	Petroleum products	\$20 million
Norco	Shell Chemical Corp.	Hydrogen peroxide, acrolein, glycerine	Late '57
Plaquemine	Dow Chemical Co.	Chlorinated petrochemicals	\$50 million; '58
St. Francisville	Crown Zellerbach	Pulp and paper	\$31 million
Shreveport	Atlas Processing Co.	Natural gas liquids	Early '58
Sterlington	Commercial Solvents Corp.	Methanol, nitrogen products	\$30 million; '57
West Monroe	Olin Mathieson	Pulp and paper	\$40 million

GALLUP SURVEY REVEALS FOR ANISE FLAVORING IN

Are You Overlooking
Profitable Markets as Shown
in This Nationwide
Survey.....→

There are many appetizing flavors on the market today, but here's one that appeals strongly to one out of every three adults in the U. S.

It's anise—made in this country under the name of anethole.

Anise, or the closely similar licorice taste, has a strong army of supporters—as shown by a recent Gallup Survey—to merit its use in many products where a variety of flavors is now offered.

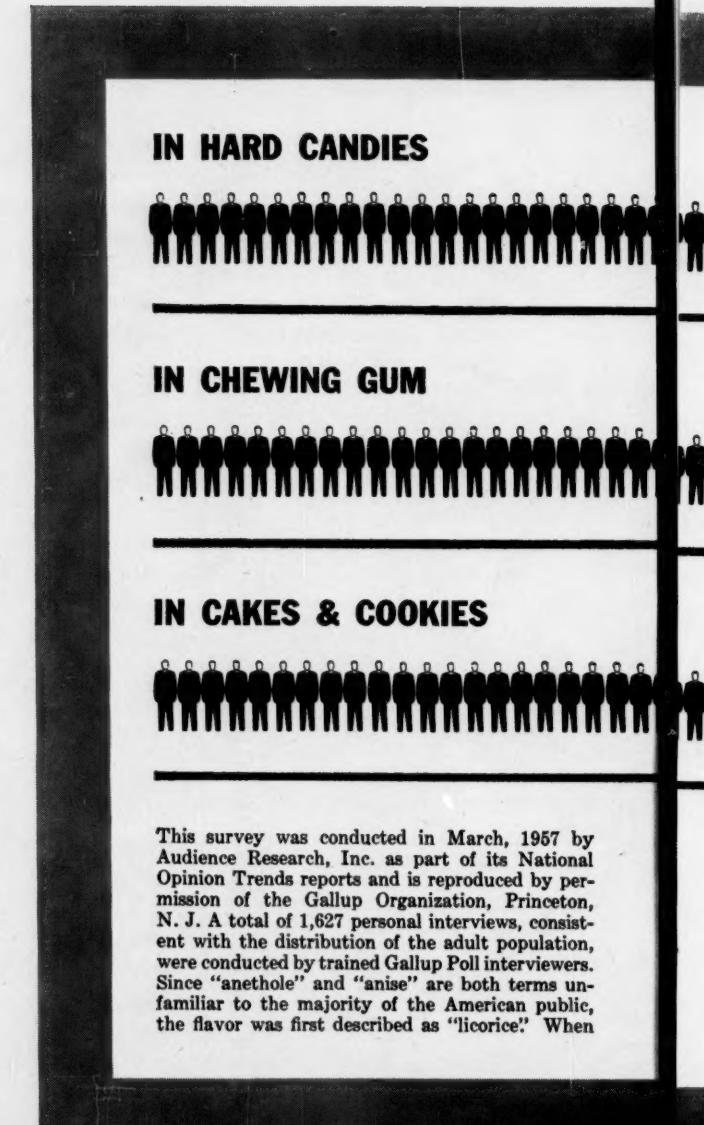
Perhaps one reason why anise, in recent years, has been overlooked is the unreliability of supply of oil of anise from Red China.

Today, American-made anethole is available in full commercial quantities, meeting U.S.P. specifications. Manufactured under rigid quality controls, and from a plentiful domestic raw material source, anethole opens the way for you to include anise-flavored products in your line without worries over fluctuations in supply.

Ask your regular supplier for Hercules® anethole or flavors based on anethole.

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HERCULES



ANETHOLE

SUBSTANTIAL PUBLIC VOTE FOODS AND CONFECTIONS

44% WOULD LIKE



31% WOULD LIKE



30% WOULD LIKE



specific preferences in cakes, candy, and gum were asked, the respondent was told "there is a flavor called anise which resembles licorice . . . suppose the following products were made with a mild licorice flavor or anise taste?" Since it is recognized in the chemical industry that anethole, U.S.P., is equivalent to imported anise, and has been used for years, the findings of this survey on anise flavor preferences can readily be applied to anethole.

Further Facts from This Survey on Public Preference for Anise

- ▶ Nearly 34,000,000 adults (based on the estimated U. S. adult population of 103 million) are real fanciers. Also, another 16,500,000 adults like the flavor.
- ▶ A larger proportion is in the upper economic group.
- ▶ There is a slightly larger proportion of women than men fanciers.
- ▶ More younger adults than older persons say the anise flavor would appeal to them.
- ▶ Strongest regional areas of preference are the East and the West, and in communities of over 500,000 population.
- ▶ Those that like the flavor are strongly in favor of it!

HERCULES

ANETHOLE

ADMINISTRATION



Petrochemical plants, such as Calcasieu Chemical's, dot the state.



Metal makers, like Kaiser Aluminum, seek water transport, fuel.



At Plaquemine, Dow builds plant to supply caustic and chlorine.

transport, e.g., Olin Revere and Kaiser.

Greatest concentration of chemical processing activity lies along the Mississippi from New Orleans to Baton Rouge. In New Orleans itself, some 18 firms have located plants, while in the New Orleans industrial area—which includes the towns of Fortier, Goodhope, Gramercy, Laplace, Reserve, Luling and Norco, among others—26 firms have facilities.

Outstanding among other chemical centers are Baton Rouge, with 15 firms, and Lake Charles, with 13. Dominating the scene at Baton Rouge is Esso's huge refinery.

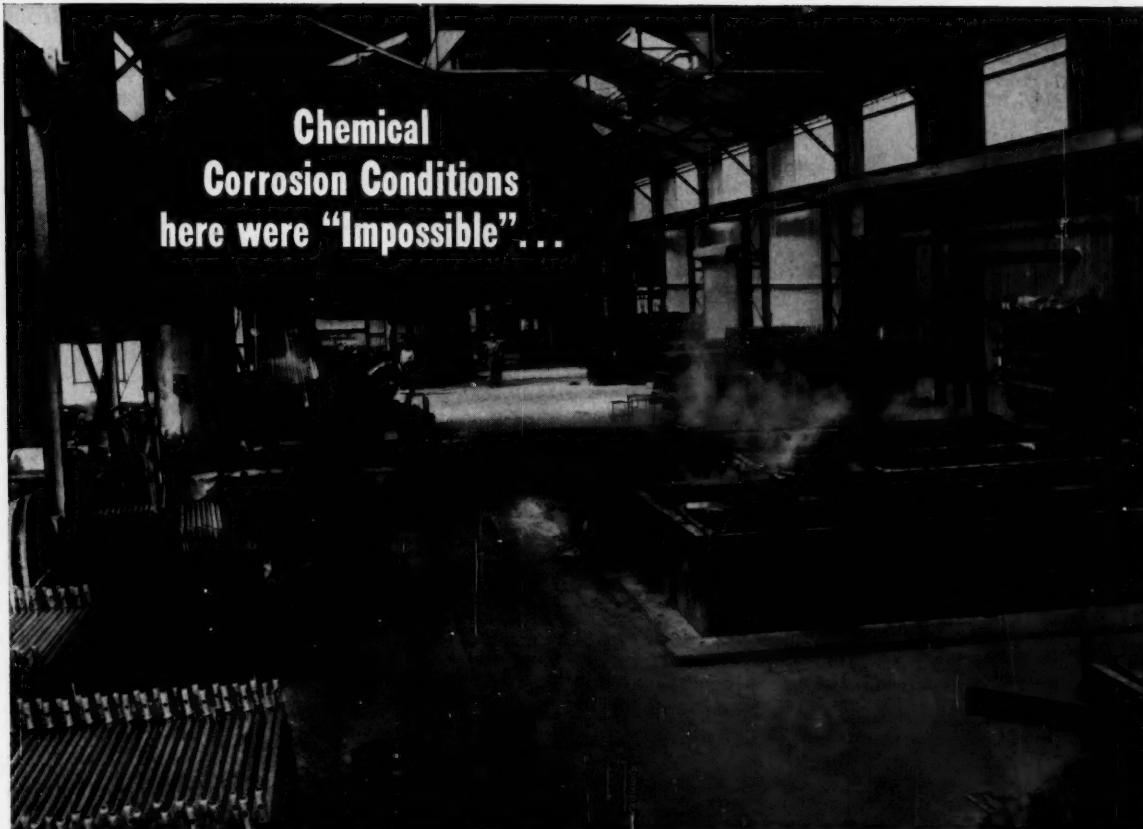
Improvements: Much has been done in Louisiana to encourage the growth of industry, though there's no surety of the continuance of the conducive political and economic climate of the past 10 years. During that time, special tax exemptions on new construction have brought in many firms, and the state legislature still takes a liberal view toward industrial encouragement.

Physically, there's much in the works. A new 19-mile Port Allen-Indian Village Canal connecting the Mississippi with the Intracoastal Canal will save 165 miles in distance between Baton Rouge and points on the canal west of Morgan City, La.

Presently on the dockets are proposals to improve and extend the facilities of the Greater Baton Rouge port. Federal projects—authorized, but with no money appropriated yet—would improve navigation on the Red and Black rivers to provide barging access to the upper Eastern and Western parts of the state, affecting such cities as Shreveport and Monroe. And just a fortnight ago, the New Orleans dock board authorized a work order for dredging a portion of the proposed tidewater channel to the Gulf of Mexico.

The Eventual Slowdown: But there are possible drawbacks, too. At present, the labor supply is plentiful; and chemical processors can be somewhat selective. But it's thought that, as industry migrates there, the cream of skilled operators will gradually be drawn off. This would necessitate drawing help from nearby states.

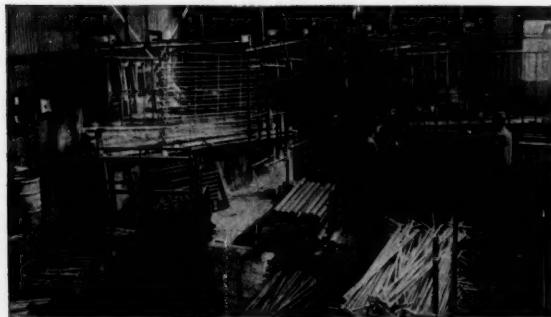
Workers who have moved from the farm to industry in Louisiana have followed the traditional pattern of not organizing. But gradually, as has been the case in other areas, the increased



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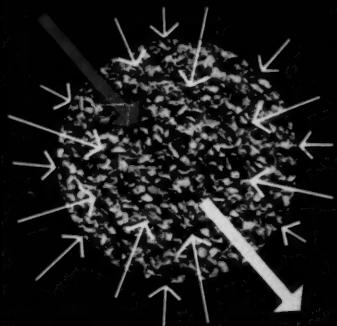


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ADMINISTRATION

industrialization is expected to result in greater unionization and agitation for higher wages and benefits.

Still another factor affecting the movement of petroleum processors is the question of the pricing of natural gas.

If gas producers are allowed to control their own prices, it's expected that the users—among them the petrochemical firms—will find themselves bidding for gas competitively with the pipelines.

All in all, though, it's certain that the chemical process industries have made deep inroads into Louisiana's economy. And Louisiana, in turn, has derived much from chemicals. If the pattern of the past continues into the future, Louisiana conceivably could become one of the great chemical-producing states.

LEGAL

Drug Ad Inquiries: Drug manufacturers have been served notice from three federal government quarters that drug advertising will be watched with a critical eye during coming months.

Both the Federal Trade Commission and the Food & Drug Administration recently announced intentions to take "prompt action" if manufacturers make false or misleading claims that their drug products are effective in preventing or treating Asian influenza.

And the House Government Operations Subcommittee plans a "double-barreled" inquiry into tranquilizer pill advertising when Congress reconvenes in January.

The government agencies are basing false and misleading cases on U. S. Public Health Service reports that inoculation with vaccine is the only reliable means of preventing influenza, and that there is no other drug available to prevent the disease. FDA says there are, however, some drug preparations that will relieve some of the discomforts of flu, and that these have a proper place in treating the patient.

The House inquiry—the subcommittee last summer investigated filter cigarettes and reducing pills—will be aimed at determining whether doctors are being misled by claims for the regular prescription-type tranquilizers and whether the public is being fooled

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INGALLS builds all types and sizes of barges for all chemical—transport purposes. One of many designed to carry a variety of chemicals is the CC-108, built by INGALLS for Union Carbide Chemicals Company. It measures 195' x 35' x 10½'... has six cylindrical tanks, each approximately 80' long. Tanks are equipped with safety valves and are engineered to withstand working pressures up to 100 lbs. per square inch. The CC-108 meets the rigid requirements of the U. S. Coast Guard. Whether your next barge job requires a special or conventional design, consult INGALLS.

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May isomerize. So: $\text{RSCN} \rightarrow \text{RNCS}$.

Will they or won't they? Which ones, how, why, and to what extent?* A chap might learn quite a bit about, perhaps, the new polyurethane resins in the course of his maneuvers. And we have seven more thiocyanates waiting in the wings for a little friendly persuasion.

At least two of our best friends among the great names of chemical industry can each fill a swimming pool for you with that half-polar, half-non-polar liquid, dimethyl formamide, a prodigious solvent for petroleum constituents, many high polymers, and such common gases as acetylene and olefins, hydrogen chloride, boron trifluoride, chlorine, hydrogen sulfide, sulfur dioxide. Not only does it serve as reaction medium for many an odd organic reaction, but it has some odd ones of its own. For example, it reacts with one mole of Grignard reagent to form aldehydes, with two moles to form secondary alcohols, or with three moles to form tertiary amines.

We have a fine time each year at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, and not only socially. We remember how on Tuesday the crowd streamed out of the Monongahela Room for mid-morning break in a lather of professional excitement over some Oak Ridge National Laboratory papers they had heard. Presently our booth was besieged. We could have sold trialkylphosphine oxides in pop bottles. Unfortunately, we had gone through life up to and including breakfast that day without, as far as we



In families—that's the way organics for research should be bought.



To us, *N,N-Dimethylformamide* is only one of an even dozen N-alkyl-substituted amides from which you can pick to optimize or bracket an effect that interests you. After you, with your

adventurous but logical mind, have made your discovery, we suspect that one of our friends or relatives would be delighted to fill your swimming pool with the amide of your choice.

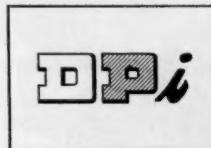
could recall, ever having heard of trialkylphosphine oxides.

Now we are better prepared. A 5-gram bottle of *Tri-n-octylphosphine Oxide* ($(\text{C}_8\text{H}_{17})_3\text{PO}$) as Eastman 7440—tested for identity and purity, sealed, and carrying our reputation with it—can be purchased for \$4.50. We see now how this compound marks the high point to date of a trend that may be expected to go farther in developing organophosphorus compounds as solvent extractants for heavy elements.

First there were tentative efforts with

tributyl phosphate. ORNL's Analytical Chemistry Section then found that phosphine oxides function as extractants in essentially strong acid solutions of 1 M or higher. Qualitatively, 49 elements have been examined for solvent extraction with phosphine oxides. Quantitatively, a good many extraction coefficients for various metals are available. Than *Tri-n-octylphosphine Oxide* there is, it seems, nothing at present known to our countrymen that forms **more satisfactory complexes with uranium** in the hexavalent state.

Price quoted is subject to change without notice.



To see what we can tell you about trialkylphosphine oxides or to get a copy of "Eastman Organic Chemicals List No. 40" write *Distillation Products Industries*, Eastman Organic Chemicals Department, Rochester 3, N.Y. There are some 3600 compounds there, and practically every one can be put under one or more such classifications as "alkyl thiocyanates," "substituted amides," or whatever other pigeonhole makes sense to you at the moment. All you have to do is pick them out.

Eastman Organic Chemicals

Also...vitamins A and E in bulk...distilled monoglycerides

Distillation Products Industries is a division of **Eastman Kodak Company**

*Aside from whatever interesting physical methods might be available to tell thiocyanate from isothiocyanate, there are chemical methods, too. The thiocyanates can be oxidized to sulfonic acids or reduced to mercaptans. The isothiocyanates smell like cooking odors from a house where they like their food spicy. Isothiocyanates can be reduced with nascent hydrogen to an amine and trimerizing thioformaldehyde. They react with sulfuric acid, liberating heat, an amine, and carbon sulfoxide. They react with thiol acids to give acid amides and carbon disulfide. On heating with water they become dialkylthioureas.

ADMINISTRATION

by "tranquilizing" claims of certain nonprescription drugs.

State Income Taxes: Multistate corporations can take heart from a recent state supreme court ruling that helps clarify at least one part of the fuzzy picture of nonresident corporation income taxes.

The Georgia supreme court has ruled that an out-of-state corporation that maintains a sales representative in the state, but no inventories, is not liable for state income tax because such a tax violates the interstate commerce provisions of the federal constitution. This voids a Georgia law fixing a 4% annual tax on net income from property or business done within the state.

The court ruled on an appeal by Stockham Valves & Fittings, which paid state income taxes in 1952, '54 and '55 under protest.

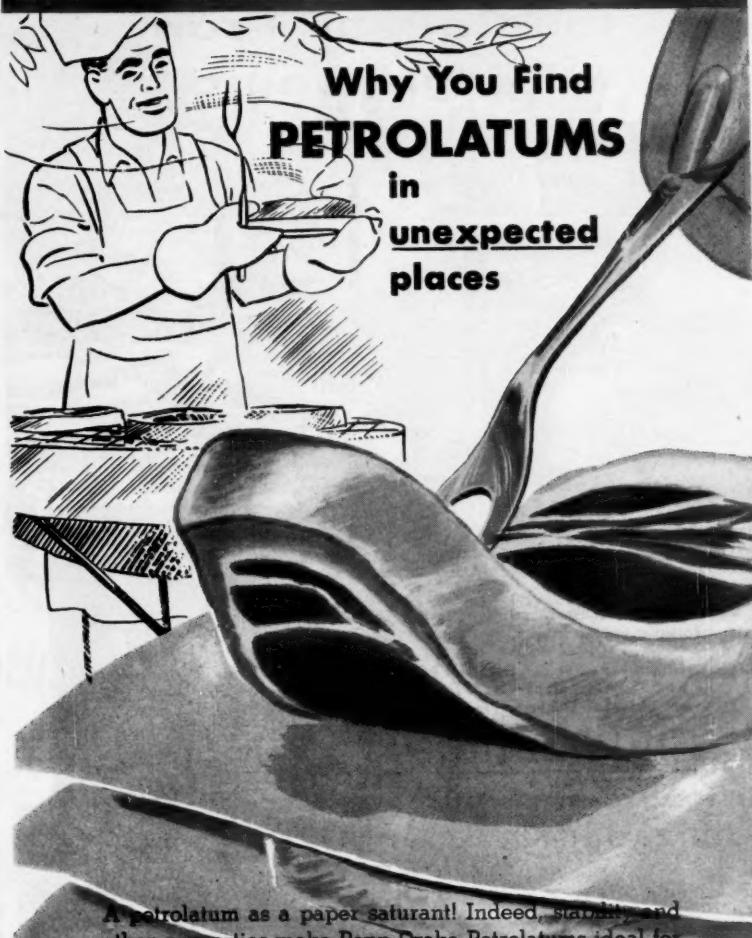
LABOR

No Letup on Du Pont: Efforts to organize employees at Du Pont's sprawling Belle Works, near Charleston, W. Va., won't let up, according to OCAW organizer Thomas Fee. Fee told *CW* the drive will definitely continue, added, "We called the workers together and talked cold turkey to them . . . told them we couldn't afford another Institute election." (OCAW recently lost out in an NLRB-ordered vote at Carbide's Institute plant.)

He said union officials demanded workers show they really wanted OCAW help, and, if not, OCAW would call a halt immediately. Du Pont workers have apparently given sufficient evidence to satisfy the union, for, Fee says, "We have enough signatures to petition [for an election], but this time we want to be sure."

Management, Too: Essence of legislative proposals to President George Meany by AFL-CIO member unions is that unions want any antiracketeering laws adopted by Congress to aim at industry practices as well as those of unions. Meany sought proposals from the membership as a result of questions asked by the Senate Select Committee on Improper Activities in the Labor or Management Field. Proposals may be used as guides for legislative action during the upcoming sessions of Congress.

PROPERTIES: Stable • Odor-Free • Taste-Free • Resistant to oxidation, light and heat • Special viscosities, melting points and color



A petrolatum as a paper saturant! Indeed, stability and other properties make Penn-Drake Petrolatums ideal for the needs of many producers of fine "parchment" food wrapping papers. Petrolatums are used also for plasticizers, detackifiers, water repellents, rust preventives, lubricants, textile specialties, etc. To many, these seem to be unusual applications since petrolatums are so closely associated with drug and cosmetic products.

Penn-Drake Technical Service will aid you in application of petrolatums to your product or processing, regardless of how unrelated to traditional applications. Write for detailed specifications.

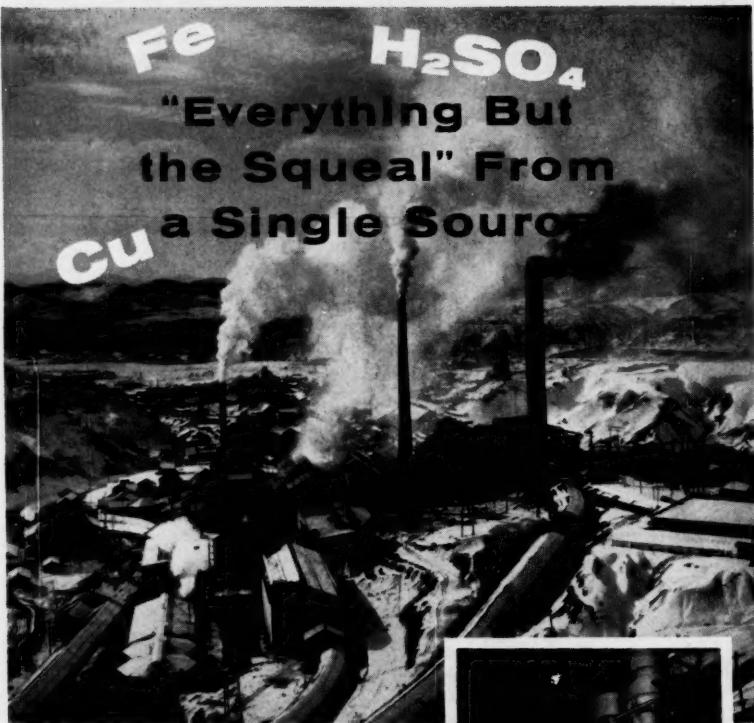


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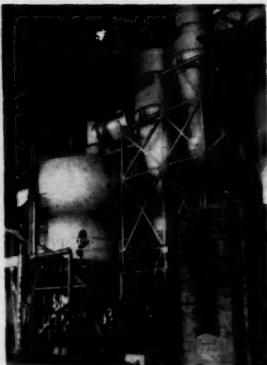
Branches: Cleveland, Ohio
and Edgewater, N.J.



Dowa Mining's Kosaka hydro-metallurgical plant where Dorrcro FluoSolids System roasts 83 metric tons of complex copper-zinc concentrates per day.

One of two 20 ft. dia. FluoSolids Reactors roasting 235 metric tons per day of crushed pyrrhotite ore at Dowa's Okayama Plant.

Fluidization— key to maximum utilization in Japan



Processing copper bearing pyrrhotite ore, the Dowa Mining Company at the Okayama, Japan plant is producing . . . and all from the same raw material . . . sintered iron ore for blast furnace use, cement copper and sulphuric acid.

Of major importance in this unique installation is the Dorrcro FluoSolids System. Utilizing the proven principles of fluidization, the crushed raw ore is roasted under controlled conditions in the System . . . providing SO₂ gas for contact acid manufacture . . . Roaster calcine is acid leached for copper recovery and leach residue is sintered as blast furnace feed.

Dorr-Oliver in conjunction with our associates in Japan, Sanki Engineering Co. Ltd. of Tokyo, have collaborated with Dowa Engineers before. At Dowa's hydro-metallurgical plant in Kosaka, Japan, the Dorrcro FluoSolids System is a prime factor in the world's first successful roasting of copper and zinc with electro winning of both metals.

For detailed information on D-O equipment and services involving the separation of finely divided solids in suspension or fluid techniques, drop a line to Dorr-Oliver Inc., Stamford, Connecticut.

FluoSolids is a Trademark of Dorr-Oliver Inc.
Reg. U. S. Pat. Off.



ADMINISTRATION

KEY CHANGES

Wyndham Hasler, Edmund A. Stephan, C. P. Neidig, Jerome Kritchovsky and Theodore Kritchevsky, to directors, Stepan Chemical Co. (Chicago).

Nicholas C. Gangemi, to director of research, Pennsylvania Industrial Chemical Corp. (Clairton, Pa.).

Hugh S. Ferguson, to director, National Research Corp. (Cambridge, Mass.).

L. K. Merrill, to vice-president—technical; C. M. Blair, to vice-president—planning; R. D. Glenn, to vice-president—development; and A. F. Sward, to manager—market research; all of Bakelite Co., division of Union Carbide Corp.

E. M. Dannenberg, to director of carbon black research, Godfrey L. Cabot, Inc. (Boston).

George N. Proctor, to general manager, Permutit Division; C. Wendell Beck, to general manager, Pfaudler Division; Claude Birch, to vice-president in charge of manufacturing policy; and H. I. Edwards, to director of sales policy; all of Pfaudler Permutit Inc. (Rochester, N.Y.).

Ralph R. Renzel, to vice-president and general manager; and Robert J. Winters, to general sales manager, Freeman Chemical Corp. (Port Washington, Wis.).

Thomas E. Moffitt, to president, Hooker Electrochemical Co. (Niagara Falls, N.Y.).

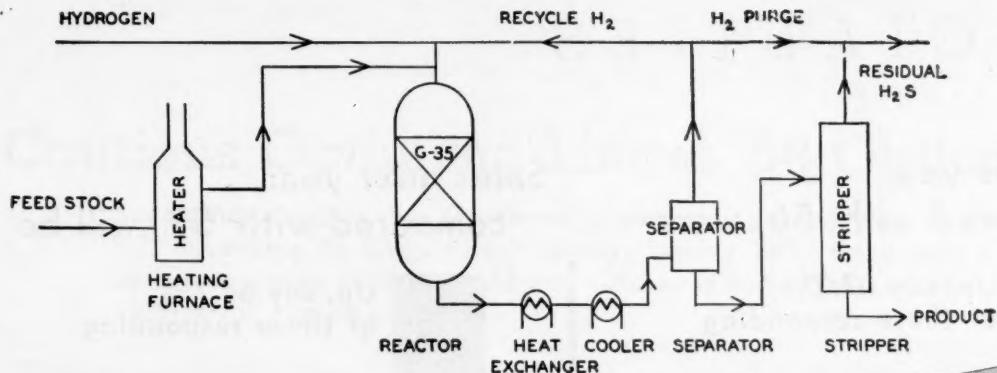
James W. Hull, to vice-president, Reynolds Chemical Products Division, Stubnitz-Green Corp. (Ann Arbor).

Theodore P. Malinowski, to assistant director of product development, Chemicals Division, Atlas Powder Co. (Wilmington, Del.).

Edward McNary, to controller and assistant secretary, Fluor Corp. Ltd.

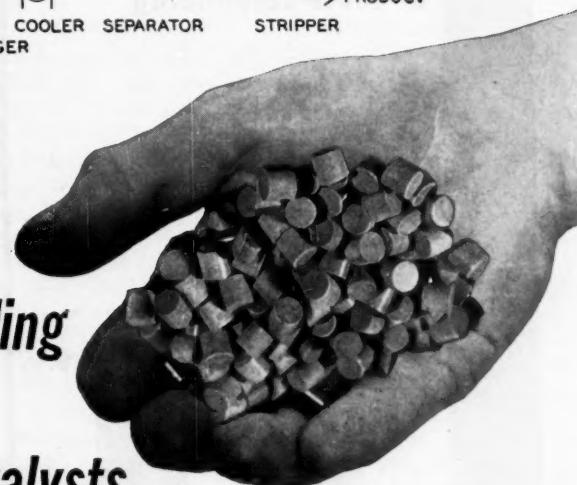
KUDOS

To Vladimir Haensel, director of refining research, Universal Oil Products Co. (Des Plaines, Ill.), the 1957 Professional Progress Award in Chemical Engineering of the American Institute of Chemical Engineers, sponsored by Celanese Corp. of America.



Naphthas, middle distillates, gas oils and lube stocks can all be upgraded by hydrogen treating with the use of new Girdler G-35 catalysts. These highly active cobalt molybdenum catalysts were developed specifically for the desulfurization, denitration and stabilization of petroleum feedstocks covering a wide molecular weight range. Typical flow diagram is shown.

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DETAILED INFORMATION is available on G-35 catalysts. Bulletin GC 304 discusses applications, gives process conditions for various distillate stocks, performance features and typical catalyst specifications. Free on request.

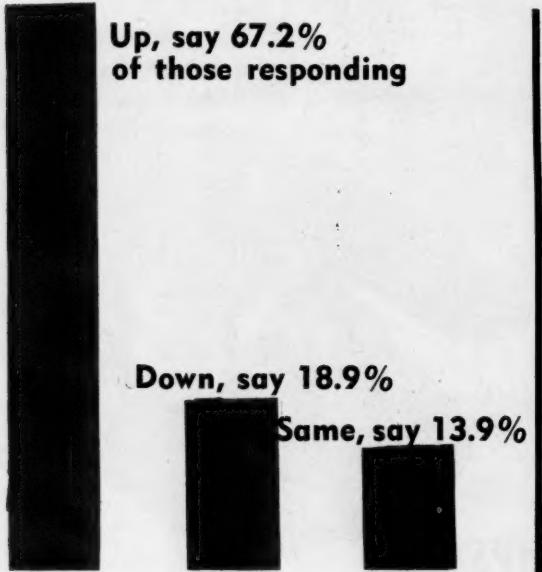
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The GIRDLER Company
A DIVISION OF NATIONAL CYLINDER GAS COMPANY
LOUISVILLE 1, KENTUCKY

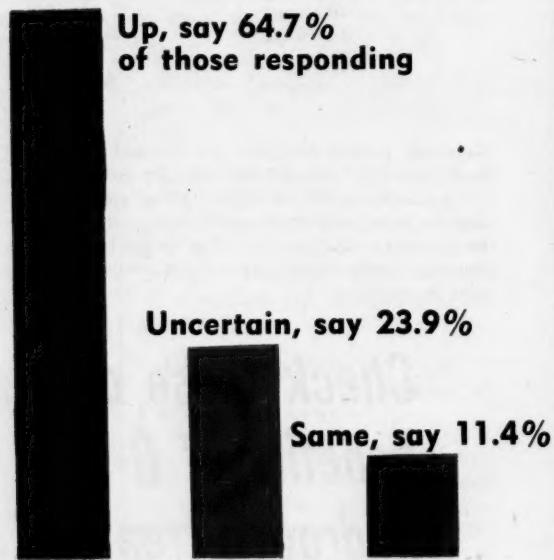
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SPECIALTIES

**Sales this year,
compared with '56, were**

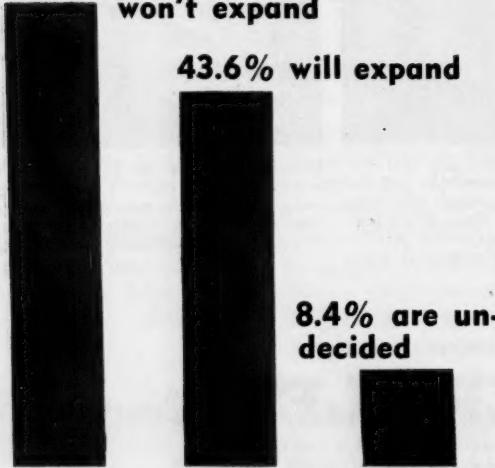


**Sales next year,
compared with '57, will be**



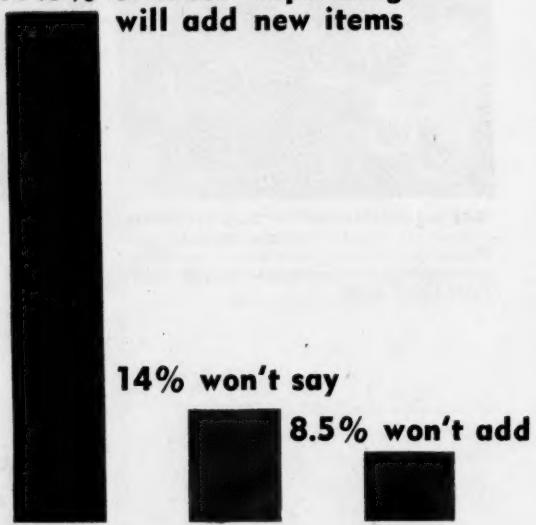
**Plans for expanding
production facilities in '58**

**48.0% of those responding
won't expand**



**Plans to add
new products in '58**

**77.5% of those responding
will add new items**



Cautious Optimism Tinges '58 Outlook

Specialties makers have enjoyed a moderately good year so far in '57, according to CW's latest survey. Nearly 50% think they'll do some expanding next year. At any rate, look for a flood of new specialties for consumers in '58.

Results of CHEMICAL WEEK's latest survey of U.S. specialties makers are in; and though they are not startling, they do provide an encouraging picture of the U.S. chemical specialties business. A check with 71 specialties makers discloses a record of good but unspectacular growth for the industry in '57, an optimistic outlook (laced with caution) for '58. Here's what they report:

How's Business? Sales this year, according to 67% of the respondents, are better than last year's, though 19% reported a decline and 14% said things stayed about the same. This contrasts unfavorably with '56—90% of the respondents considered '56 better than '55 (80% said that '55 was better than '54).

Looking ahead, 65% of the specialties makers think '58 sales will top those of '57, 11% figure that sales will be off, 24% won't hazard a guess. To meet this hoped-for increase in business, 43% of the respondents plan increases in production facilities in '58. Most companies figure on expansions of 20-25% (29% of respondents), then 10% (20%), followed by 50% (11.4%). Expansions of 30%, 100% and 5% were each indicated by 10% of the respondents.

That 43% who are willing to take a flyer on the future is a pretty thin crowd, compared with the '56 survey's 76.4% who said they intended to expand in '57.

How They'll Grow: Of those firms looking toward expansion, about 85% say they'll do it from reserve funds and 8% will use bank loans. Factoring will be used by 6% and stock issues and other means will pay for the rest. A year ago when specialty makers talked of expanding, 75% said they would use reserve funds, 20% had a visit to the bank in mind, factoring looked good to 3%, and 2% were planning on stock issues for financing increased capacity. The fact

that specialties makers are looking more to reserve funds this year is undoubtedly the result of another finding of this year's survey—25% of the respondents said that getting credit this year was tougher than in '56.

All these figures mean "nothing unless you know who's doing the talking. Here's a profile of the companies that answered CW's survey:

Products: As it did last year, the survey covered six general product areas defined by the Chemical Specialties Manufacturers Assn.: (1) waxes and floor finishes, (2) aerosols, (3) automotive, (4) disinfectants and sanitizers, (5) household insecticides, (6) soaps, detergents, sanitary chemicals.

About 70% of the firms queried have products in more than one of the six categories; 38% have wax products, 42% aerosols, 20% automotive specialties, 35% disinfectants and sanitizers, 38% insecticides, 55% soaps.

More than half the respondents (56%) are in the \$3-million-and-up sales class (manufacturer's level), 9% are in the \$2-million-plus class, 17% in the \$1-million-plus group. Of the remaining 18%, about 11% sell \$500,000 to \$1 million worth of goods and the remaining 4% and 3% are in the \$100,000-and-under and \$100,000-500,000 grade, respectively. Total annual sales would be well over \$200 million.

Class of '56 Revisited: Because CW does not ask respondents to identify themselves, there's no way of making exact comparison of one year's survey with another. A check on the major areas of interest of each list, however, gives reasonable grounds for supposing that essentially the same groups are answering the survey each year. Last year's survey group, for instance, resembled this year's group in several ways: 66% of respondents had multi-category products (70% this year); 33% made wax products (38% in

'57); 40% aerosols (42% in '57); 11% automotive specialties (20% in '57); 30% disinfectants (35% in '57); 25% insecticides (38% in '57); and 56% soaps (55% in '57). The group surveyed in '55 had essentially the same makeup.

Do-it-yourselfers: Examining the '57 and '56 groups, one trend is very apparent—more specialties makers (58%) are making all their own products. Another 36% make some of their own products, farm some out. The rest (6%) did no manufacturing at all. In comparison with this, of firms queried in '56, 35% reported making all of their products, 55% were sharing the manufacturing with outsiders, and a full 10% made none of their own products.

Further comparison brings out the relatively small increase in the number of companies marketing aerosol products. In '56, nearly 40% of the firms queried were involved with aerosols in one way or another, a big jump over the 23% who could say that in '55. In '57, the increase was only 2%, to 42%. In light of the fantastic growth of aerosol sales, it seems quite likely that the industry is quickly coming of age.

Industry Concentration: Big complaint is that many small firms are dropping out, big outfits either forcing them to the wall or buying them out. This is the sentiment expressed more by the aerosol makers than by any other group. They aren't alone in their plaint, however; nearly 60% of the respondents see the concentration in a few large firms as a continuing trend in their industry, 8.4% insist it is something new, 11.6% say it's an upcoming trend. As might be expected, most of those firms in the \$3-million/year group see little evidence of this trend, while the smaller outfits fear they may be next.

Fad Feeders: Whether big or small, specialties makers will strive in '58 to satisfy the U.S. consumers' insatiable

WITCO CHEMICALS AT WORK



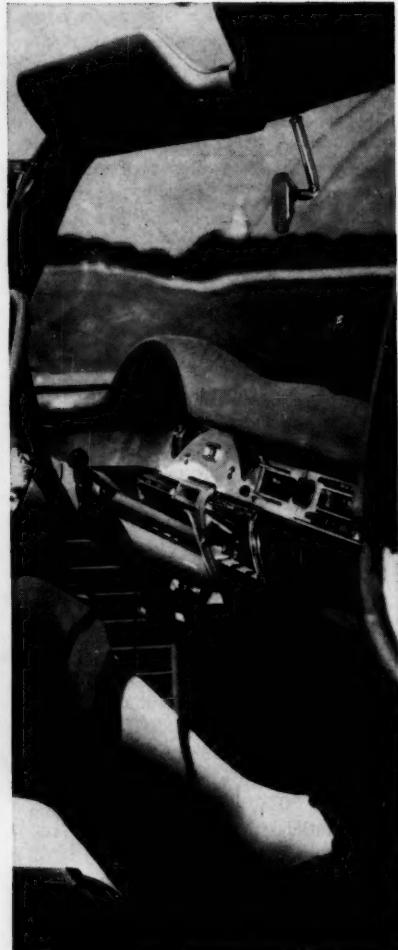
BLACKOUT ON WEAR

Tire treads must be tougher as wheel diameters become smaller and superhighway driving increases. Tire life and dependability are keeping pace with this challenge through the use of Witco-Continental carbon blacks. Continental Carbon Company.



QUICK SCRUB

The "one-minute" car wash puts a premium on quick wetting, thorough detergency and dirt-removing action in car-wash detergents. Ultra's SULFRAMIN® E Liquid is ideal because of its high-powered detergency backed by dirt-lifting foam and excellent rinsability. Ultra Chemical Division.



PLASTIC PADDING

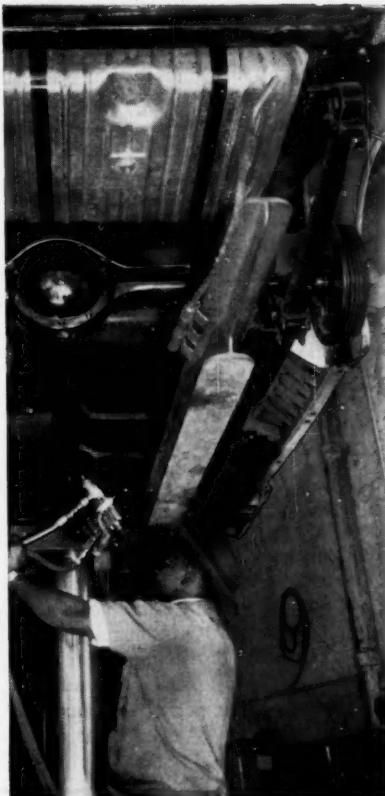
Fine-celled foams are essential to the quality of urethane products such as this safety padding for dashboards. Formulated by Witco specifically for urethane applications, FOMREZ® 50 Polyester Resin produces foams of excellent appearance and performance.

Cars look and ride better... are safer...because Witco Chemicals do their part



BEHIND THE GLEAM

High-quality chrome plate or enamel finishes depend on a completely clean metal base. On car bumpers and body panels, Emulsol's EMCOL emulsion-degreasing detergents economically remove all oil and grease to leave a spotless surface for plating or spraying. For details on degreasing with EMCOLS, write for Bulletin No. 38. Emulsol Chemical Division.



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Yet this is just *one* field in which Witco products are doing their job *well*. One or more of the chemicals from Witco's 14 plants may benefit *your* process or product, and we would welcome the opportunity to discuss them with you.

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SPECIALTIES

appetite for something new, novel or better. An innovation-minded 77% of the respondents have plans to launch at least one new product in '58. About 8.5% will stick with proved products, 14% won't tell their plans.

Getting the labor to handle expansion of production facilities and new products doesn't appear to be a pressing problem to many specialties makers. Some 30% report no difficulty in getting help in any category of personnel. This is 5% higher than last year. Getting salesmen is still a problem, even a little more than it was last year. In '56, 41% of the respondents reported difficulty; this year, 44% say they could use some sales help. Skilled labor is hard to find by 27% of the respondents, production specialists by 21.1%. An interesting note: to the query on salesmen shortage, many respondents qualified their admission of a shortage, claiming there is a dearth of "good" salesmen. Only 22.5% of them admit to difficulty in filling positions in the management category. This, despite the wailings some of them have raised on the subject before convention groups, informed gatherings and for publication. Lack of good management apparently is the other fellow's problem.

Irksome Costs: One problem that seems to rankle most specialties makers, even if personnel does not, is distribution. Over 75% of the respondents say that their distribution costs have risen in '57; most of them cite a figure of 10% as the percentage increase. To the question of distribution costs,

many respondents emphasized their irritation by writing "yes" in big letters.

Distribution costs may have risen in many cases due to the initial expenses involved in switching to new outlets or adding new ones. And almost half (46.3%) of the respondents say they have done some of this switching in '57. The ones most often changing outlets were those with \$3 million in sales. They have generally changed to supermarkets and chains "where the grocer is more aggressively seeking high-margin nonfood items."

Specialties makers, if their prognostications are correct, face a good year in '58, but they'll have to work harder—as will almost all industries—to make the same profit. As one specialties manufacturer put it: "58's going to separate the men from the boys . . . and the frost will be on the business bumpkin."

PRODUCTS

Wire Coating System: The Schenectady Varnish Co. (Schenectady, N.Y.) has developed an electrical insulating varnish-wire enamel system that will withstand temperatures as high as 180 C, yet can be applied and cured at conventional temperatures (around 290-325 F). Designated Isonel 175 wire enamel and Isonel 31 high-bonding insulating varnish, they are both polyester-type materials.

Gay Blades: The radiation warning symbol of three propeller blades will stand out more effectively with

Profit-Sharing Plateau and Union Gain

In '56's CW survey, 42% of the respondent companies had some type of profit-sharing plan—the large companies used formalized plans; the smaller ones, bonus plans. This year's survey indicates no growth in that direction; again 42% of the respondents report they use profit sharing.

In sharp contrast, unionization seems to be making big gains in specialties manufacturing outfits. The '56 tally for plants having unions—28% (30% had independent organizations; the rest were affiliated with national labor organizations). This year, 53% have unions (22% independent unions, 78% national). In '56, 14% of those granting general wage increases said they did so under union pressure. In '57, that figure has climbed to 24%.

VERSATILE POLYMER PVP

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Detergents: Prevents soil redeposition, controls color bleeding, and reduces irritation.

Lithography: Colloid for diazo and dichromate sensitizers. Excellent post-etch. In fountain solution, helps keep cloth rollers clean.

Paints: Improves pigment dispersion and film leveling. Makes possible use of dyes to obtain new colors and shades.

Waxes and Polishes: Improves luster, cleansing action, flow, and wetting.

Cosmetics: In hair preparations, PVP improves hair management. Acts as a detoxifier. Stabilizes lathers in shaving preparations and emulsions in skin cleansing products.

Pharmaceuticals: Minimizes toxic side effects of many drugs. Prolongs drug action and increases effective blood level. Acts as suspending agent in liquids and binder in tablets.

Beverages: Removes chill haze and acts as a clarifying agent by complexing with and precipitating tannins in beer, wines and fruit juices.

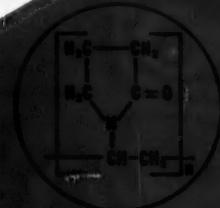
Adhesives: Gives stable dispersions of vinyl adhesives and superior adhesion.

Paper: Produces better pigment dispersions, smoother coatings. Improves wet strength and ink receptivity.

inks: Better gloss and pigment dispersion. Increases solubility of dye-stuffs and prevents gelation. Can improve ball-point inks, typewriter ribbons and carbon papers.

Textiles: Prevents flocculation of titanium dioxide in delustering of synthetic fibers. Adaptable as warp size for acetate and viscose. Improves other sizes. Improves dye receptivity of hydrophobic fibers. Dye scavenger in print washes.

Glass: Gives outstanding adhesion to glass surfaces. Acts as a glass fiber forming size for increased strand strength.



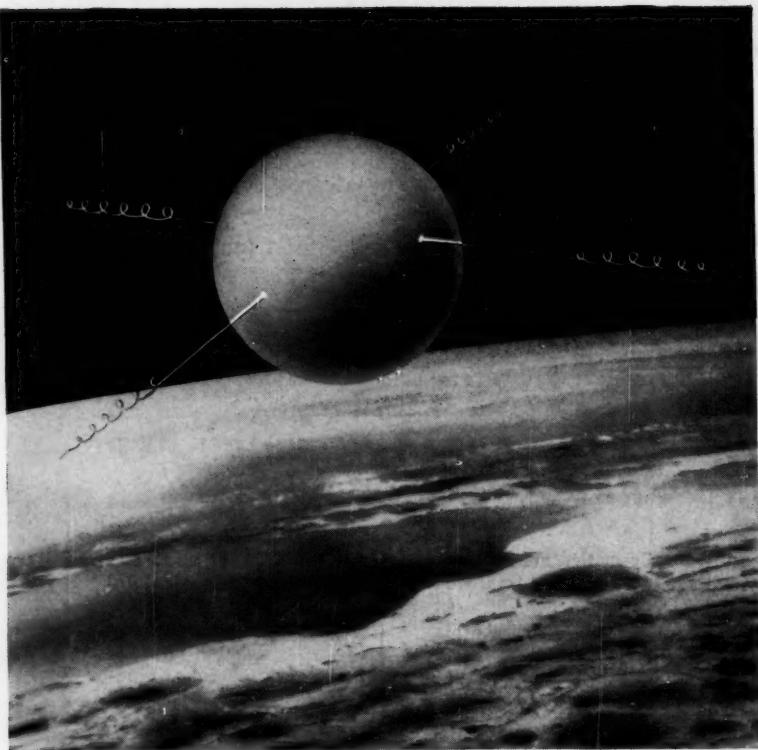
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SPECIALTIES

a daylight fluorescent paint of vivid reddish-purple developed for that purpose by Switzer Brothers (Cleveland). It's AEC-approved, tradenamed Radiation Purple Sunbonded Day-Glo paint. It comes in brush, spray and aerosol forms.

Plastic Tube Dispenser: A new device for dispensing products from plastic tubes has been developed by the Sugar Beet Products Co. (Saginaw, Mich.). It is a bracket molded from rigid polyethylene, which screws into walls and holds a plastic tube in an inverted position. The tube is simply screwed into the threaded opening in the bracket. The device is called the Type T-1 Wall Bracket.

Strippable Coating Line: Bischoff Chemical (Ivoryton, Conn.) has come out with a new line of strippable coatings. One, a cold-application coating, is called V-12 Vinyl and is available in clear or transparent colors. One gallon of the material will provide a 1-mil-thick coating for approximately 300 sq. ft.

Antistatic Agent: Ethylsulfonylethanol, suggested for use as a solvent, process intermediate or antistatic agent of extremely low toxicity, is now commercially available from Pennsalt Chemicals (Philadelphia). A white crystalline solid, the material can be used as a solubilizer, humectant and antistatic agent in cosmetic and pharmaceutical formulations; as a removable antistatic agent for acrylic and vinyl films, fibers and fabric; as an intermediate for plasticizers and monomers; and as a solvent and coupling agent.

New Shine Line: Krylon Inc. (Norristown, Pa.) has added a line of all-purpose varnish sprays to its list of aerosol products. Designed for interior and exterior use, the varnish sprays may be used on new or previously finished wood, metal, etc., and polished with emulsion- or solvent-type polishes. Price: \$1.79 for a 16-oz. container.

Loaded Item: Bissell Carpet Sweeper Co. (Grand Rapids, Mich.) has introduced an appliance, called the Bissell Shampoo Master, which is a long-handled device with a sponge on the end and a hollow shaft. The liquid

shampoo, which the device uses, called Liquid Rug Cleaner, will also be marketed under the Bissell name. The appliance will sell for around \$15, the cleaner, for \$1.95 for 22 oz.

Aluminum Powder: Atomized, granular and flaked aluminum powder is now available from Hummer Chemical Co. (New York). The powder may be used as a filler in epoxy resin formulations, reducing agent, pigment, or in plastic "cold solders."

Mid-East's First Lube-Oil: Seventy-eight kinds of lubricants produced by the Middle East's first lubricating oil plant (at Dora, Iraq) are now being sold on the Iraqi market. The \$12-million lube-oil plant near the government oil refinery at Dora, a Bagdad suburb, brings the total cost of government-owned petrochemical industries there to nearly \$60 million. The lube-oil plant's present capacity is 17,000 tons annually—equal to Iraq's consumption of all kinds of lubricants in 1956.

The plant has been designed for a full capacity of 25,000 tons/year and is expected to reach this figure within a few years.

Prices of the lubricants are 5-20% lower than imported products, saving the consumers (especially the Iraqi farmers) about \$750,000/year. The lube-oil plant will save Iraq about \$6 million in imports, Iraqi sources estimate.

Real Red: Geigy Dyestuff's latest development is Maxilon Red BL, described as the "first true red for acrylic fibers, especially Orlon." It's said to hold light-fastness for all depths of shades.

Vapor Barrier: Aluminum foil insulation with polyethylene backing is now being offered by Reflectal Corp. (Chicago). Available in two types, Alfol Type 22, for ceilings and sidewalls, and Type 44, for crawl spaces and exposed ceiling installations, it's said to insure complete moisture protection.

Cold Gluing: N. V. Nico ter Kuile and Zonen of Neede (province of Gelderland, in eastern Holland) is now marketing a set of adhesives with which polyamides (nylon, akulon, perlon) can be glued together or to



Got something hot on the fire? Call on US

It's true that if you toured our modern research facilities, you'd find a whole rash of bunsen burners, test tubes, beakers and flasks. By the same token, it's true that you'd find the last word in scientific research equipment—including the electron microscope, spectrometer, radioactive tracers, Geiger counters.

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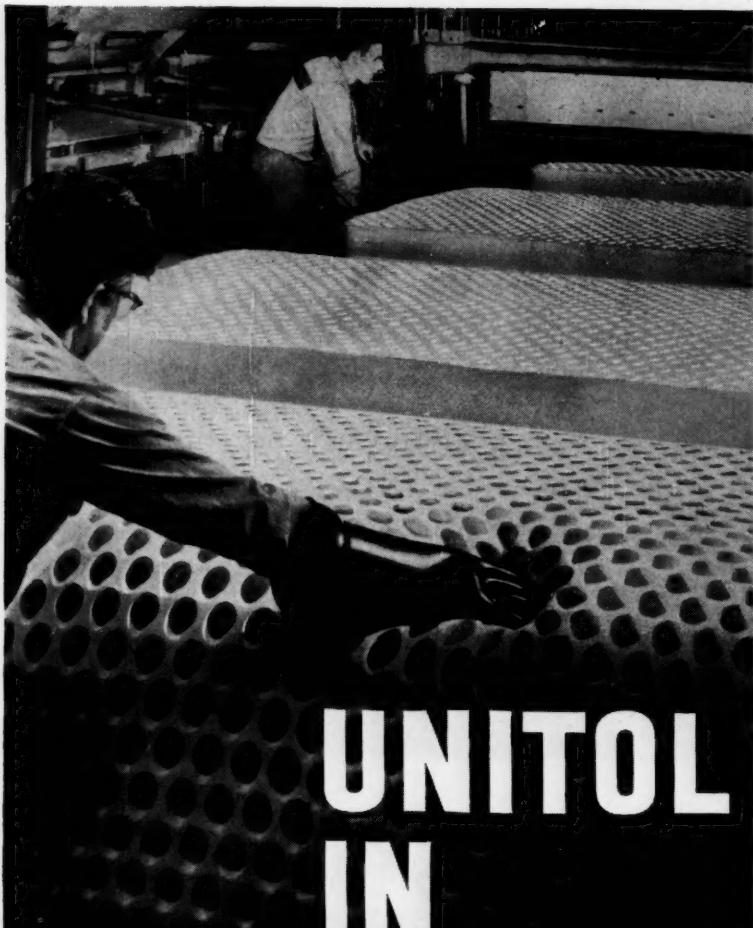
If you have a chemical or process problem on the fire—by all means, get in touch with us. We'll be glad to lend technical assistance. We may even have the answer you're looking for right in our files. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*



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UNITOL tall oil products are important ingredients in the manufacture of foam rubber. Added to the latex during compounding, *UNITOL* helps to increase the foaming that gives this popular rubber product its characteristic resiliency and light weight.

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SPECIALTIES

other substances, generally without preheating.

Outdoor Mylar: A weatherproof-type Mylar polyester film, is Du Pont's latest product development. Du Pont estimates a five-year life for weatherproof Mylar (in 5-mil thickness), which it is pushing for greenhouse construction. Price: \$3.25/lb. or 11.5¢/sq. ft.

Heavy-Duty Surfactant: Miranol CM CONC, a surfactant for heavy-duty liquid steam cleaning compounds, is now being offered by The Miranol Chemical Co. (Irvington, N.J.). This new powdered concentrate is said to be corrosionproof, corrosion preventive and to compound with lower alkalinity than present heavy-duty powdered surfactants.

Low-Cost Alkyd: The Panelvite Division of St. Regis Paper Co. has come out with STRalkyd, a glass-reinforced alkyd molding compound. Due to its low process cost, STRalkyd is designed to compete with phenolics, ureas, melamines and metals for use in radio and TV cabinets, switch-gear moldings, high-voltage aircraft insulation, small appliance housing and replacements for die casting.

Dry Bleach: Cowles Chemical Co. (Cleveland) is now offering a laundry bleach designed for dry application direct to the wheel. Tagged Dry Chlorsuco, the new bleach is claimed to remove mildew stains and to strip out lime and acid soaps.

96% Pure: Now available from Aceto Chemical Co. (Flushing, N.Y.) is 2:4 dimethylaniline (meta-xylidine) with a purity content of 96%. Meta-xylidine is used in certified food colors and as an intermediate in dyes and pigments. Also available from Aceto is Chrysarobin—a remedy for skin diseases—obtained from the Goa powder of a common Brazilian tree.

Rare Chemicals: Chemicals Procurement Co. (New York) is now supplying these biochemicals: DL-(*o*, *m* and *p*)-fluorophenylalanine; fluorescein amine (1 and 2); DL-homoserine; mescaline HCl; and oxythiamine HCl.

Fatty Alcohols: Two pharmaceutical-grade unsaturated fatty alcohols

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RE-57-2

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WHOEVER AND WHEREVER YOU ARE, you are approaching completion of a special program. Your project involves one or more "heavy" rare earths in reactor technology, special weapons, electronics, alloys or cermets. By now you've passed the breakthrough point — you're ready to move from the pilot stage to full-scale production.

Michigan Chemical Corporation is ready to supply you with production quantities of the "heavy" rare earths you need. You can specify oxides or salts, even certain metals. Prices are reasonable and purities are warranted to 99.9%.

If you are interested in any quantities of rare earth elements — write for prices, availability and technical data sheets on your company letterhead.

RARE EARTHS AND THORIUM DIVISION

MICHIGAN CHEMICAL CORPORATION
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SPECIALTIES

are being introduced by Archer-Daniels-Midland Co. The two alcohols, Unadol 400 (principal component—linoleyl alcohol) and Unadol 900 (principal component—linolenyl alcohol), are said to give increased stability, better emulsification and neutral pH characteristics.

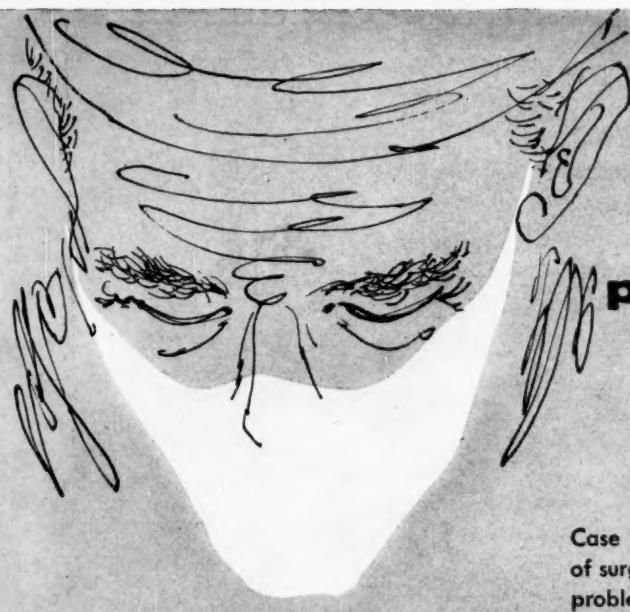
Stops Fire: Flameproofness for plastics, protective coatings, fluids, textiles, paper and wood products is Michigan Chemical Corp.'s newest product advancement. The compounds, said to impart flameproofing and self-extinguishing properties to these materials, are tetrabromobisphenol-A, tetrabromophthalic anhydride, tris (2-bromoethyl) phosphate, pentabromophenol and tris (2,3-dibromopropyl) phosphate.

Waxlike Resin: A new waxlike polyethylene resin is available from Eastman Chemical Products, Inc. Called Epolene "C", the resin can be handled as a melt, with or without modification, according to Eastman. At 300 F, for instance, the viscosity of the resin is 8,000 cps. The addition of 25% paraffin reduces the viscosity to 1,300 cps. at 300 F. Uses include melt casting for slush-molded objects and paper.

Metal Wrap: A transparent, heat-sealable, rustproof packaging film for metals can now be obtained from Daubert Chemical Co. (Chicago). The product, called MY-V-I, is a high-tensile-strength polyester (Mylar) film. MY-V-I (1.5 mils thick), is available in rolls 12 in. wide and 100 yd. long.

Invisible Coating: Magnus Chemical Co. (Garwood, N.J.) has just come out with a colorless coating for nonferrous metals that restores the color and gloss of faded paint or enamel films. Magnus says the high-gloss polymeric finish won't peel or turn yellow before at least three years.

Over the Counter: Tetrazets troches —antibiotic tablets for sore throats—can now be purchased without a prescription, according to a recent Food and Drug Administration ruling. The tablets, made by Merck Sharp & Dohme (Philadelphia), contain three antibiotics: zinc bacitracin, tyrothricin and neomycin sulfate, plus the analgesic, benzocaine.



**you, too, can
profit from stability
in OLEIC ACID**

*here's how Emersol 233 LL
Elaine increases shelf-
life of a surgical soap*

Case History No. 83-02: A large manufacturer of surgical and germicidal soaps continually had problems of storage stability of a high grade surgical soap. The development of rancidity and changes in color were particularly disturbing to users of the soap especially where cleanliness and sterilization are imperative. Upon investigating Emersol 233 LL Elaine, this manufacturer found it so superior to the double distilled oleic acid he had been using, that it eliminated all problems of instability and odor development. Emersol 233 was also tried in other germicidal soaps in this manufacturer's line and the improvement in stability was again outstanding.

This is but one example of how outstanding stability improved a group of products. In any product, the replacement of ordinary oleic acids by a comparable Emersol grade prevents the development of rancid odors and avoids discoloration, breakdown of emulsions, changes in texture, and any deterioration of performance. So, why risk your products' good reputation when you can guard against failures so easily—by always buying the Emersol brand when you need oleic acids.



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AT FOOTE the LITHIUM story is 450 feet long

The country's most exhaustive collection of printed material on lithium—its characteristics, compounds, and applications—rests on 450 feet of library shelving at Foote Mineral's Berwyn Research Library. Here is the up-to-the-minute history of lithium . . . indexed for immediate access to any one of 13,000 references which chemically, physically, and metallurgically describe this most unusual of all metals. Begun more than a quarter century ago when Foote pioneered in the development of lithium, it is still growing at the rate of well over a foot of library shelf a week.

What does this mean to you? Well, lithium and its compounds in a very few years have outgrown the laboratory curiosity stage to become important factors in chemistry . . . ceramics . . . greases . . . organic intermediates . . .

nuclear energy . . . to name but a few. Chances are that in the next five years you'll be investigating lithium as it might apply to your field. But when you do . . . before you invest time, effort, and money . . . your ideas will be thoroughly researched in this immense accumulation of data, by men who have played an important part in discovering the facts and creating the literature.

• • •

Write for *Chemical and Physical Properties of Lithium Compounds* and a taste of what Foote's store of lithium information has to offer you. This Data Bulletin is available on request to the Technical Literature Department, Foote Mineral Company, 420 Eighteen West Chelten Building, Philadelphia 44, Pa.



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Technology Newsletter

CHEMICAL WEEK
December 7, 1957

Look for more activity in polypropylene (see p. 31) soon. The present pace of research and pilot-plant work indicates it's only a matter of time before still more companies declare themselves in. For instance, at the recent dedication of its new research lab, Sun Oil put a new plastic on display. The firm has admitted to work in the polyolefin field; and while it will not identify the new plastic, it seems a good bet that it was polypropylene.

Du Pont and Carbide are believed well advanced in polypropylene development. Phillips has said publicly that its chrome oxide process is capable of producing an isotactic polymer. Goodrich-Gulf is also believed active in polypropylene. Some regard highly the Standard of Indiana's process as a route to polypropylene, so that would make Standard of Indiana and its licensees (Spencer, Tennessee Eastman) candidates for polypropylene production.

Stauffer Chemical has been working on polypropylene—but for a different reason. It has no interest at all in making polymers, but it does see the field as an important market for catalysts. It is supplying titanium trichloride for development work, is working on other metallic chlorides (e.g., vanadium). And it is also looking closely at the organic metallic portion of the catalyst.

And in Europe, too, a number of firms are working on polypropylene, although Hoechst is the only one to announce commercial production outside of Montecatini. (Montecatini has licensed Hoechst to use a Natta process, but Hoechst will not say whether or not it is using this license in its plant.) Huels in Germany and Petrochemicals (a member of the Shell family) in England are known to be developing polypropylene. ICI, too, is thought to have some polypropylene tricks up its sleeve.

An elastomeric polypropylene may well be the next development to look for from Montecatini. Natta has showed that it's possible to tailor a molecule to give it elastomeric properties. In fact, Montecatini has big plans for polypropylene. It has produced films and fibers from the resin in addition to a large number of molded products. The films show good clarity, are said to be strong and possess excellent dielectric properties. The fibers have been woven into garments (e.g., socks). Although admitting that dyeing polypropylene has been a problem Montecatini has been able to solution-dye it, has made some progress in adapting conventional dyeing techniques.

Like Hercules, Montecatini makes a point of the generally excellent molding characteristics of polypropylene. And also like Hercules' claims are its statements that stability is no longer a problem. However, there's still some skepticism on that score in this country. Some feel that the present knowledge of stability is based on accelerated tests, which don't always accurately reflect actual service life.

Technology

Newsletter

(Continued)

Availability of propylene raw material has been a limiting factor in Montecatini's plans. The firm presently has a cracking plant that gives it 10,000 tons/year of ethylene, and a roughly equivalent amount of propylene. But it has ordered new units that will effectively quadruple its olefin production. So, if marketing lives up to expectations, the next step for Montecatini would be a 50-million-lbs./year poly plant.

No such raw material limitations exist in this country. Hercules will get its material from Sinclair Chemical, which is building a plant (to start up shortly) at Marcus Hook, Pa. Propylene will be separated from the refinery stream, purified, liquefied and shipped by tank truck to Hercules' Parlin works.

An important point to remember in assessing U.S. propylene supplies: while much of it is produced in refineries, the plastic-grade material must be purified, probably to a high degree. And the refiners have a ready market for the less-pure material in poly gasoline. So the customer, buying it to polymerize it, will end up paying a sizable premium.

But polypropylene will still be a cheap plastic. Hercules will initially charge 65¢/lb. for its material, expects that price to drop. Montecatini has no price schedule for this country but has been selling its polypropylene in Italy for about 50¢/lb. There's little doubt that eventually it will be as cheap as or cheaper than polyethylene.

Wah Chang's new zirconium purification plant (Albany, Ore.) has just started up, on the heels of an Oregon Metallurgical Co. (also in Albany) announcement of a \$4-million contract to deliver zirconium ingots to Westinghouse. Oregon Metallurgical and Wah Chang Corp. will work together to fill the Westinghouse order.

Wah Chang's new plant has a capacity of 13,000 lbs./day, more than twice the capacity of the Albany facilities it had been leasing from the Bureau of Mines. The company converts tetrachlorides of zirconium and hafnium into oxides, then separates them. The hafnium is turned over to the Bureau of Mines, which processes it for the Atomic Energy Commission. The oxide is reconverted into tetrachloride for reduction to zirconium sponge. Oregon Metallurgical melts the sponge, converts it into ingots.

Fractional melting is a new answer to the growing need for extremely pure materials. National Bureau of Standards has applied the technique to purifying 2,5-dichlorostyrene, used as a potting agent for electronic components.

By the Bureau's method, the liquid is slightly supercooled, allowed to crystallize slowly. Impurities crystallize last—toward the top of the sample. Then, the ampoule is inverted and heat is applied. Impurities (near the bottom) melt first and are drawn off. Final fractions are of the desired purity.



*A few gallons
of vinyl resin coating give...*

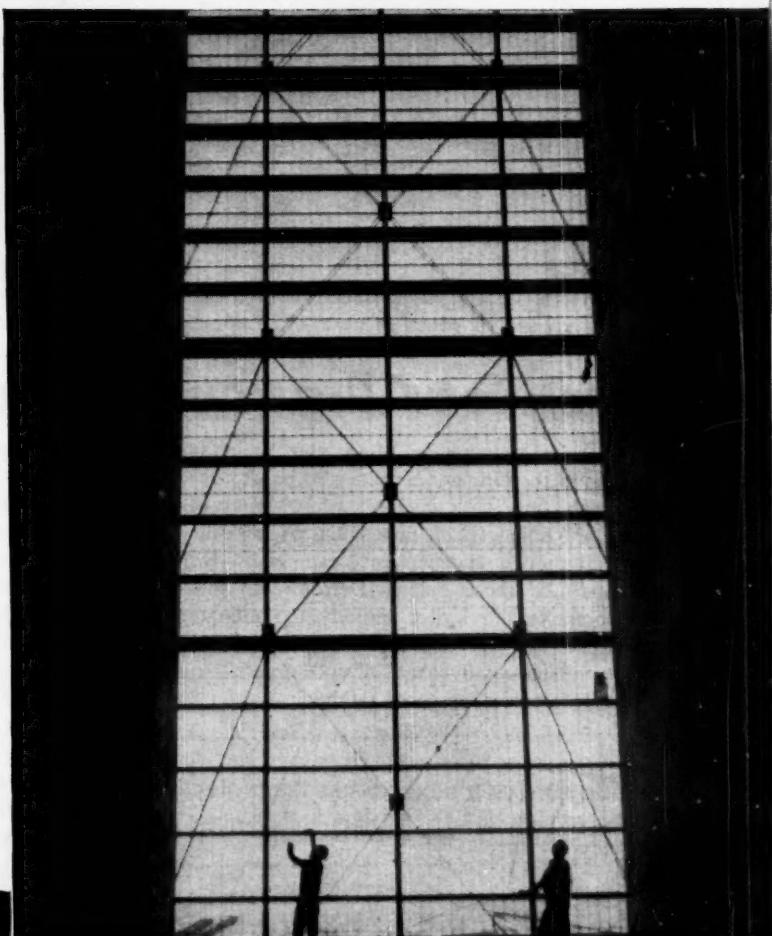
protection from tons of surging water

When The Dalles Dam on the Columbia River in Oregon is completed by the U. S. Army's Corps of Engineers, millions of tons of water will rush through openings like the one shown at the right to operate huge turbines.

The grille-like coverings prevent debris from getting to the delicate turbine blades. The terrific friction between rushing water and the steel structures would destroy any ordinary paint. Yet in spite of this erosive action, coatings of vinyl resins were specified . . . based on years of experience with similar applications. BAKELITE Brand Vinyl Resins satisfied this specification in every respect.

When you have an unusually tough coating problem to solve, investigate versatile BAKELITE Vinyl Resins. Formulated for use on metal, masonry, concrete and wood—interior or exterior—these tough coatings withstand hard usage, and give excellent resistance to chemicals, gases, weather extremes. Get the facts from your supplier, or write for our free booklet, "BAKELITE Resin Coatings for the Chemical Industry," to Dept. YS-34.

Below: the exterior of The Dalles Dam with the trash racks partially installed. This is only part of the millions of square feet of steel that will be under water or intermittently wet and dry.



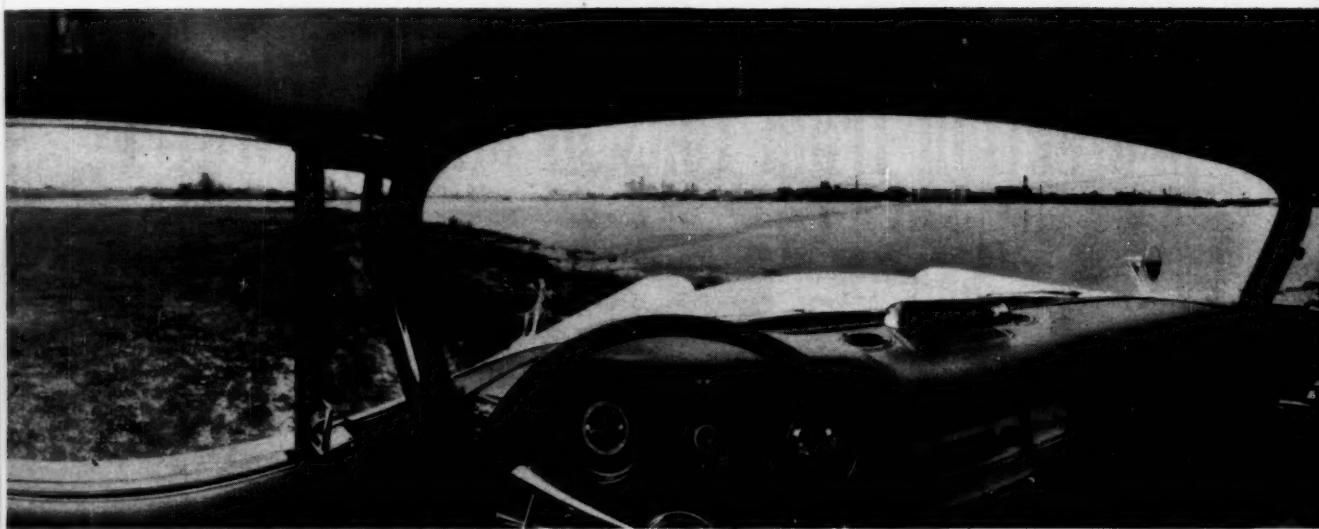
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SALES AND DISTRIBUTION



Extensive use of glass in new 1958 cars is shown in photo taken with special camera equipment.

Push for All-around Laminated Safety-Glass

Chemical companies often aim their advertising pitches at the ultimate consumer to boost sales of basic materials, and that's precisely what Monsanto and Du Pont are doing. Each hopes that as a result of concerted, though independent, campaigns—which use slogans like those below—Detroit auto makers will be compelled to switch entirely to laminated safety glass in all car windows. But there's a question whether the campaigns will be an all-out success—some auto companies prefer tempered safety glass.

Behind the current advertising push (running in *The Reader's Digest*, *Saturday Evening Post*, *Time* and other consumer magazines) was the decision of some automobile producers to use tempered safety glass in '58 models. (Chrysler Corp. cars, Rambler, and many Studebaker-Packard models).

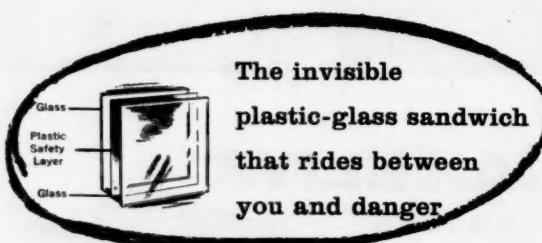
Monsanto and Du Pont, of course, hope to cultivate greater markets for their polyvinyl butyral interlayers, which, according to the firms, "put the lamination in laminated safety glass." Inroads by tempered safety glass threaten a significant part of the polyvinyl butyral business, currently estimated at \$20 million/year for automobiles.

Du Pont's plastic interlayer sheet is trademarked Butacite; Monsanto's, Saflex. Neither company makes glass, but together they produce practically all the polyvinyl butyral interlayer sheeting used in the U.S.*

Polyvinyl resins for Monsanto's product come from Shawinigan Resins Corp. (half-owned by Monsanto); Du Pont makes its own basic material.

But the ad campaign is actually only one jaw of the vise the chemical companies are applying to Detroit's auto makers. More direct pressure is coming via direct-mail promotions, motion pictures and special reports addressed to car producers, all stressing the claim that the laminated product has a greater safety factor. But the companies have a tough hurdle to clear: the laminated product can't be produced at prices competitive with tempered glass, which reportedly runs \$2-6 less per car.

Be sure your next car has the protection
of laminated "safety-cushion" glass



The invisible
plastic-glass sandwich
that rides between
you and danger

...any side?
Laminated safety glass
You know it must
be in the wind-
shield—but what
about the door windows? If you

*Union Carbide's Bakelite Division was a third interlayer supplier, but recently withdrew from the market.



Apparent distortion disappears when picture is held in semicircle around the head at eye level.

Rams into Opposition from Auto Makers

Laminated auto glass is produced by squeezing a layer of plastic between two sheets of plate glass, under a combination of heat and pressure. On impact, this type of glass cracks but doesn't shatter or become clouded. And it can be cut to size at any time after it is manufactured.

Tempered safety glass is a single layer of toughened glass, tempered under extreme heat. Disadvantages of this material are (1) its tendency to become clouded on impact; this reduces visibility below a functional minimum, and (2) it cannot be cut after it's manufactured. The latter is a tremendous disadvantage in the auto-glass replacement field.

The tempered vs. laminated fight concerns side windows only. For years all new cars have been required, by law, to have laminated safety glass in windshields. This provides an assured market to those involved in the manufacture of plastic-and-glass sandwiches and their components.

But rear and side panes are not considered critical from the point of safety because occupants are usually thrown forward—not toward the rear—in auto collisions.

A look at the potential market shows the new-car field consuming a total annual volume of 135 million sq. ft. of glass for windshields and side panels.

Replacement Market: But that's only part of the story. With 68 million cars on the road this year, the replacement market will consume 47 million sq. ft. of auto glass for windshields and side panels.

Largely because it can be cut to size in a glass shop, laminated glass makes up 90% (81 million sq. ft.) of

the replacement volume of today's market.

Total potential of new-car plus replacement volume is 178 million sq. ft./year. At the current average price of 0.1173¢/sq. ft. for polyvinyl butyral interlayer, this indicates a market potential of nearly \$21 million for suppliers Du Pont and Monsanto.

The switch of the three auto makers to tempered side glass in some '58 models will cost the two chemical companies about 7.4 million sq. ft. of butyral, or about \$870,000 in lost business. If Ford, reportedly on the fence, changes, the loss would be doubled. And these figures do not include plasticizers.

Chemical companies can expect little solace from some glass makers, though Libbey-Owens-Ford (which supplies GM) is pushing TV advertising of laminated plate glass. Pittsburgh Plate Glass (which supplies Chrysler, the independents, and some Ford business) is staying neutral, however.

The Flat Glass Jobbers Assn. is on the side of the chemical companies. Laminated glass eases stockpiling problems for jobbers because it can be cut to measure with simple equipment. But one big motive of this group is shown by a Canadian statistic. In that country, because tempered glass is widely used for side windows, the replacement market is only one-tenth what it might be if side windows were laminated. (All 48 states and the provinces of Canada require laminated safety glass in windshields of cars and trucks, whether domestic or imported, for the obvious reason that some degree of visibility is retained after even the most severe fracture.)

Backfire: It's no secret that the Monsanto-Du Pont



METSO BASIC SILICATES IMPROVE YOUR CLEANING COMPOUNDS

Metso Silicates fit your detergent manufacturing operations. Sized between 10 mesh and 65 mesh which means . . . no coarse particles to slow up dissolving or give compounds an unattractive appearance. Fines are removed to minimize dusting and eliminate caking.

EXPLORE THESE METSO SILICATES
FOR YOUR COMPOUNDS...

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anhydrous sodium metasilicate

METSO GRANULAR
sodium metasilicate pentahydrate

METSO 99
sodium sesquisilicate

METSO 200
sodium orthosilicate, concentrated

Metso Silicates are packed in multi-wall paper bags and fiber drums. For convenience and economy, unlabelled packages are available; identified only by your code number and weights.

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9 PLANTS • DISTRIBUTORS IN OVER 65 CITIES

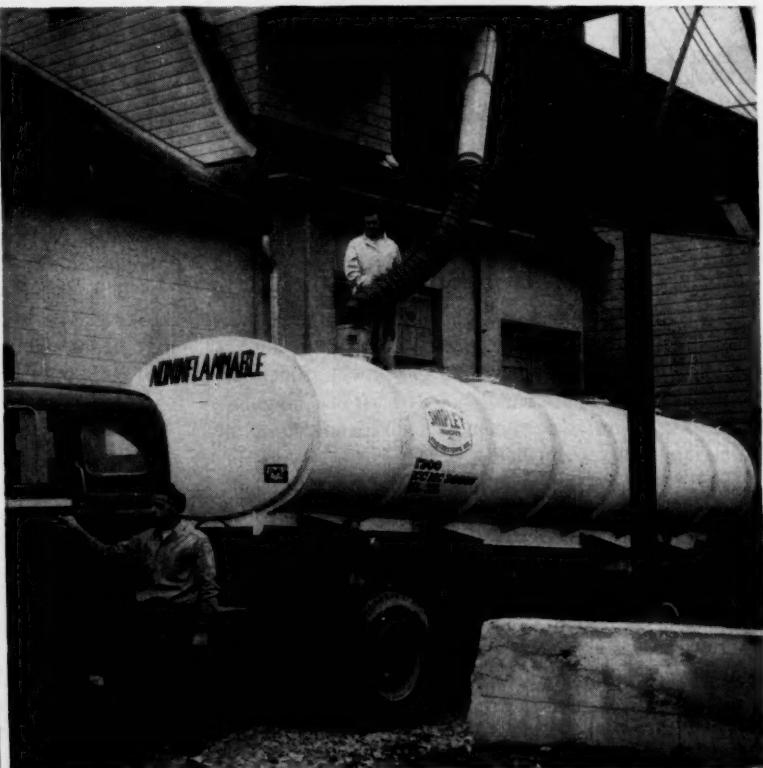
SALES

campaign is antagonizing some auto makers. They are sharply critical of what is termed "carrying on negotiations in the public press." And they are just as infuriated at the confidential safety studies made by the chemical suppliers. The studies purport to show that laminated glass, which would cost the auto industry more, is safer than tempered. Here's how a highly placed auto engineer analyzes one such report that advocates laminated glass use:

The report states that tempered safety glass has these faults: (1) variable strength, (2) low resistance to missiles, (3) poor passenger retention-capabilities in collisions, (4) zero visibility when the glass is shattered, and (5) resistance to breaking by oc-

cupants seeking to force an emergency exit.

The auto engineer's rebuttal: (1) "Variable strength? Standard ASA tests show it takes a half-pound steel ball 35 ft. of free fall to break tempered glass but a 2-ft. fall will break laminated"; (2) "Yes, tempered does have lower resistance to missiles but side windows are seldom subject to this type of blow"; (3) "As for passenger retention capabilities, the overwhelming majority of glass breakage on human contact is in the windshield, where tempered glass is never used"; (4) "Visibility is reduced to zero on impact. That's precisely why we never put tempered in the windshield. In side windows, the safety hazard is not too great, and can be eliminated by re-



Now: Aluminum Chloride in Bulk

Allied's Solvay Process Division initiated dump-tank truck shipment of anhydrous aluminum chloride last week. Because of its hygroscopic nature, aluminum chloride is generally shipped in hermetically sealed steel

drums—but for the new system the cargo is protected from the atmosphere by flexible sleeves during loading and unloading. The 26-ft.-long trailer can haul 18 tons of the compound when fully loaded.

Is there a missing tank car in your future?



That's almost certain to be the plight of companies who don't plan for their tank car requirements in the decade ahead. It's no secret that available general-purpose tank cars are going to be limited. With normal obsolescence of today's facilities, the continuing steel shortage, and with forecasts pointing to a more than 50% expansion in our economy, *liquid product shipments may be difficult . . . may miss tomorrow's sales opportunities.*

*P. S. Plan now to discuss your long-range needs with our
GATX District Man. You'll find . . . it pays to plan with
General American.*

GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street • Chicago 90, Illinois

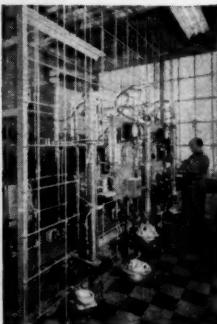


... FROM A VAST CRESYLIC RESERVOIR *

NEW HIGH-PURITY IN CRESYLICS

From PITT-CONSOL's vast refining plant come phenols, cresols, xylenols and cresylic acids of a purity unsurpassed by any other producer of refined acids. Derived from petroleum, they contain *no neutral oils, no tar bases . . . practically no sulfur*. This high purity is helping to solve problems of color, odor, and chemical reaction control in many plants where high grade phenolic resins, esters, pharmaceuticals, detergents, disinfectants, solvents and other end products are produced.

PITT-CONSOL purity is consistent . . . Skilled technicians using the latest equipment and analytical control methods assure you uniformity in every shipment. For more information on PITT-CONSOL's *high-purity* refined acids or complete technical assistance, please write or call.



PITT-CONSOL
CHEMICAL COMPANY

191 DOREMUS AVE., NEWARK 5, N. J.

A SUBSIDIARY OF PITTSBURGH CONSOLIDATION COAL CO.

SALES

placing the offending piece"; (5) "Tempered glass is difficult to kick out. But there is always the laminated windshield, offering the biggest potential exit."

Both sides missed other pros and cons. The legend that tempered glass can be shattered by scratching it is somewhat dispelled by knowledge that the temper is 0.09 in. deep on both sides. It will withstand scratches up to half this depth. Unprotected edges are a little more vulnerable, but take considerable chipping.

Type of glass is not a factor in auto pilferage. Any professional burglar can open a locked car in less than a minute without touching the glass.

Clouding has not been a detriment with laminated glass since cellulose nitrate and acetate were abandoned as laminates in the early '30s. Neither is it necessary to seal exposed edges with asphaltum.

Either type of glass can be treated with sun-absorbing color, a factor of growing importance in this era of greenhouse-like cars.

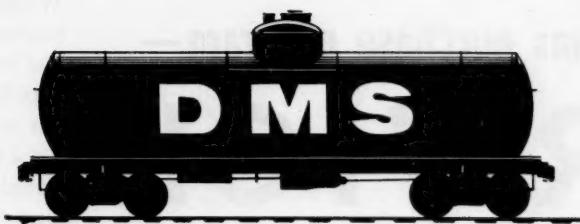
Forced Decision: In any case, if the Du Pont-Monsanto ads are successful, and customers start demanding laminated glass in all car windows, sales of the butyral product will certainly increase.

The success, however, won't sit well with auto makers if their out-of-pocket costs go up. Feelings about the chemical companies' consumer-aimed ads can be summed up in the words of one car maker: "If car buyers want laminated windows, we'll have to provide them. But the chemical companies' approach is simply a high-pressure method of making a decision (as to what glass to use) that should be made by the automobile manufacturers."

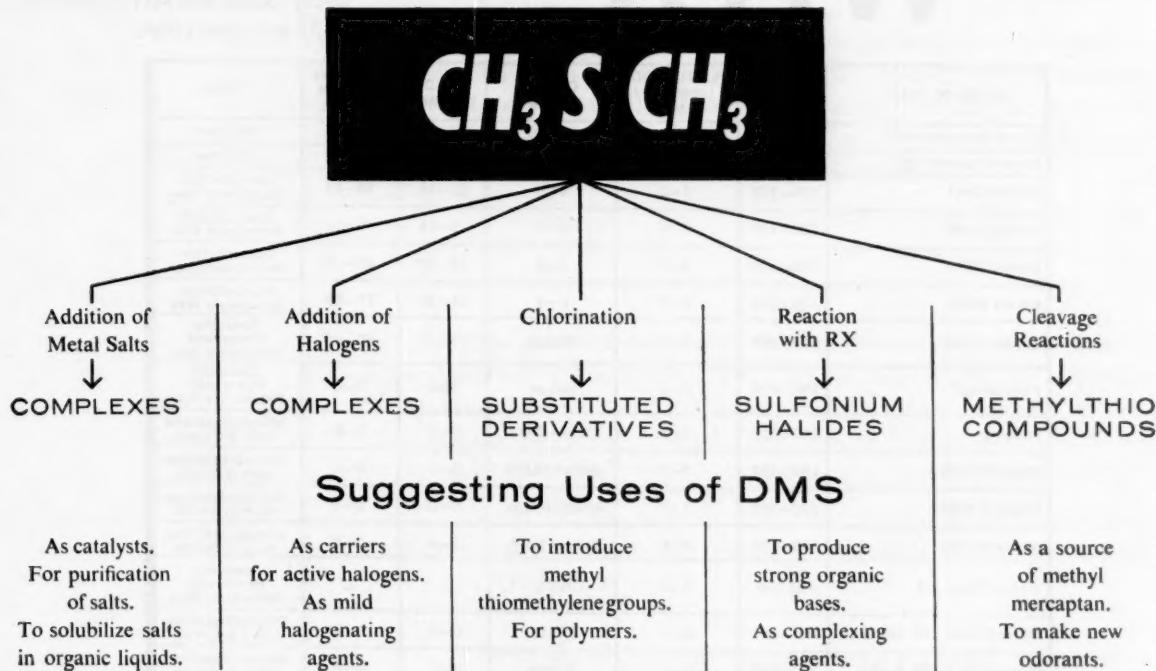
DATA DIGEST

- **Vinyl plasticizers:** Performance characteristics, physical properties and applications for monomeric epoxy plasticizers are discussed in new technical bulletin. Argus Chemical Corp. (Brooklyn, N. Y.).

- **Ceramic binder:** Bulletin delineates use of chemically active Polyfon ceramic binder in wall tiles, electrical porcelain, refractories, clay pipe and structural clay products. Polychemicals Division, West Virginia Pulp and Paper Co. (Charleston, S. C.).



Which of these reactions fits your needs?



Which of these reactions suits *your* needs?

Now for the first time, large quantities of low-cost 99+% pure dimethyl sulfide are available to industry—in tank cars; in 55-gallon drums; or in 5-gallon cans.

This important industrial chemical is a simple organic liquid derived by Crown Zellerbach from lignin and sulfur under exclusive patent rights.

By integrating production of dimethyl sulfide with its vast kraft pulping process, Crown Zellerbach can now make large volumes of this low-cost chemical available for applications heretofore considered uneconomical.

Beside the uses outlined above, dimethyl sulfide is also well suited to these functions:

- Solvent in extraction
- Solvent vehicle
- Odorant or masking agent

The staff of the Chemical Products Division offers its research facilities to explore applications of specific interest to you. Please send coupon for sample and technical information brochure.

Also available: limited quantities of dimethyl sulfone and dimethyl disulfide for experimental purposes.

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Camas, Washington

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Chemical Products Division
Camas, Washington

Please send dimethyl sulfide sample _____
dimethyl disulfide sample _____
dimethyl sulfone sample _____

Name _____

Firm _____

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Warwick Waxes—waxes of proved performance—offer you the broadest selection in the wax field. Whatever your product or your problem—for technical help on formulations, for samples, for technical data, our wax chemists are at your service. Write or phone Warwick today...ask for our 1958 price and distributor list. Prompt delivery. Stock and service centers in 33 principal cities.

NAME OF WAX	M.P. A.S.T.M. D-127-30	PENETRATION 100G/77°/ 5 SEC.	COLOR N.P.A.	ACID NUMBER	SAPONIFI- CATION VALUE	TYPE
Cardis Polymer #10	212-216	0-1	1-1½	8-10	25-30	Polymer
Cardis Polymer #8	205-210	1-2	3-5	7-10	24-28	Polymer
Cardis Onet	195-200	1-2	4-5	12-16	55-65	Emulsifiable Petroleum Wax
Cardis 314®	184-189	4-6	4-5	13-16	45-55	Emulsifiable Petroleum Wax
Cardis 319®	180-185	5-7	4-6	18-20	65-70	Emulsifiable Petroleum Wax
Cardis 320®	180-185	5-7	4-5	28-30	75-80	Emulsifiable Petroleum Wax
Cardis 262®	195-200	3-5	Brown	14-17	40-45	Specially Processed Petroleum Wax
Polymekon®	195 MIN.	0-3	Yellow	0-0	0-0	Specially Processed Petroleum Wax
Fortex®	190-200	3-5	2½-3½	0-0	0-0	Microcrystalline Hard & Plastic
Mekon® B-20	190-195	3-5	Brown-Black	0-0	0-0	Microcrystalline Hard & Brittle
Mekon® A-20	190-195	3-5	Amber-6 Max.	0-0	0-0	Microcrystalline Hard & Brittle
Mekon® Y-20	190-195	3-5	Yellow-3-3½	0-0	0-0	Microcrystalline Hard & Brittle
Warco® Wax #5	158-160	9-10	Ivory	—	—	Specially Processed Petroleum Wax
Warco® Wax 180 White	180-185	4-7	White	0-0	0-0	Microcrystalline Hard & Brittle
Warco® Wax 180 Brown	180-185	4-7	Brown	0-0	0-0	Microcrystalline Hard & Brittle
Warco® Wax 170-A Yellow	170-175	10-15	Yellow 1-2	0-0	0-0	Microcrystalline Plastic
Warco® Wax 170-A Brown	170-175	10-15	Brown	0-0	0-0	Microcrystalline Plastic
Warco® Wax 150-A Yellow	145-155	15-20	Yellow 1-2	0-0	0-0	Microcrystalline Plastic
Warco® Wax 150-A Brown	145-155	15-20	Brown	0-0	0-0	Microcrystalline Plastic
Warcosine®	150-155	15-20	White	0-0	0-0	Microcrystalline Plastic
Paraffin	136-138	FULLY REFINED				Crystalline
Cane Wax 500	171-176	3 Max.	Light Brown	25-35	55-70	Vegetable Wax
Cane Wax 517-711	171-173	2 Max.	Black	—	—	Vegetable Wax
Cane Wax 700	169-174	1.0-1.5	Light Brown	25-30	70-90	Vegetable Wax

† Pat. No. 2,471,102

* Patent Applied For.

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Midwest Office: 6556 S. Melvina Avenue, Chicago 38, Illinois • Ludlow 5-5700

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Market Newsletter

CHEMICAL WEEK
December 7, 1957

Will ethyl alcohol prices be higher on first-quarter '58 schedules?

Answer to that question won't be known definitely for a week or so, but the trade has been rippling with speculation for some time. Since prices were not hiked at the beginning of the fourth quarter, some consumers were convinced that the rise was simply to be postponed until the next quarterly notification deadline date (Dec. 15).

Some published comments still hold that major producers will advance alcohol prices because of climbing labor, manufacturing, container and freight costs. But at least three makers indicate that they won't alter the current 47¢/gal. (tanks) tag. Why? Says one to *CW*: the present economic situation just doesn't warrant an increase at this time.

Domestic demand incidentally, has been fairly brisk, and some U.S. sellers have been supplying a rather tight European market. Prices there range 10-13¢/gal. above U.S. quotations.

The general trend of price revising these days is up, but there are a few significant cuts being made, too. Carbide, for example, has just posted reductions on its butyl acrylate and ethylhexyl acrylate. The new prices—effective Dec. 1—reflect tank-car reductions of 10¢/lb. on the butyl and 5¢/lb. on ethylhexyl (c.l and l.c.l. quantities are lowered proportionally).

Butyl acrylate, in tanks, now costs 55¢/lb.; in c.l., 57½¢; l.c.l., 58½¢/lb. Ethylhexyl acrylate prices, in the same order, are 50¢/lb., 52½¢ and 53½¢/lb.

Down sharply, too, are one producer's zirconium sponge prices.

Early last week, Carborundum Metals (Akron, N.Y.) slashed tags on reactor-grade zirconium, to \$7.50/lb. (in 1,000-lb. lots) from a previous \$11, and cut commercial-grade sponge prices to \$5/lb. (1,000-lb. lots). It's the company's third major zirconium price reduction in four years.

Carborundum's hope is that lower cost of "excellent quality" zirconium will foster wider reactor applications, and that reductions in the commercial-grade sponge will be "of particular interest to the chemical industry (where) increasing quantities are being used for its corrosion-resisting properties."

The lower prices, says Niles Bartholomew, vice-president and general manager, are the result of "production efficiencies and increased output." The firm recently upped capacity of its Parkersburg, W. Va., zirconium sponge plant to 1.2 million lbs./year.

Sales of most pesticides are slow at the moment, although DDT business is said to be picking up some. At any rate, one major producer had advanced DDT prices by about 2¢/lb.—his reason: "higher manufacturing and shipping costs." New c.l. tag for 100% DDT will be 21¢/lb.

Market Newsletter

(Continued)

(chips and flakes) and 22¢ for bag-packed powder. Prices are freight-allowed to all points in continental U.S.

Heartening to DDT sellers, however, are trade reports that General Services Administration will soon issue a procurement order for 25-30 million lbs. of 75% wettable powder to be delivered before April for shipment abroad.

Ammonium sulfate stocks are still climbing in most producing areas, but inventories may be whittled soon. An announcement is expected late this week concerning contracts for shipments of the sulfate and other fertilizer materials to Korea. Although no specific figures are being mentioned, market followers indicate that the quantity involved will be "considerable."

Naphthalene demand continues to lag as it has for several weeks, chiefly because of the slow phthalic anhydride market. Stocks of the former are said to be quite heavy, and there's little relief in sight. One report notes that phthalic exports are still doing well, but these may slip as current production bugs are ironed out of recently launched European installations.

Despite the dull phthalic-naphthalene outlook, though, prices aren't expected to change for a while at least.

Borax prices are slated to rise Jan. 1. An increase of about 5% will be put through by Pacific Coast Borax, a division of United States Borax and Chemical.

The advances amount to \$2.50/ton on 10-mol borax; \$3/ton on 5-mol borax. Anhydrous material will increase by \$4.50/ton and boric acid a like amount.

Although there's no word yet on what other major borax producers (American Potash & Chemical, Stauffer, West End Chemical) will do, chances are the PCB tags will be industry-wide.

SELECTED PRICE CHANGES — WEEK ENDING DECEMBER 2, 1957

	Change	New Price
DOWN		
Butyl acrylate, dlvd., tks.	\$0.10	\$0.55
Ethylhexyl acrylate, dlvd., tks.	0.05	0.50
Carnauba wax, Yellow No. 1, Ceara, bgs., ton lots	0.01	1.37
Ouricury wax, pure, refd.	0.01	0.72
Molasses, blackstrap, feed grade, N. Y., tks.	0.02	0.20
Zirconium sponge, reactor grade, 1,000-lb. lots	3.50	7.50

All prices per pound unless quantity is stated.



RAYON is a good mixer!

Rayon is a universal favorite because it comes in so many varied textures and wonderful colors. Increasingly, too, this versatile test-tube fiber is being blended with others to give fabrics luxurious appearance at reasonable cost. Truly, rayon is a good mixer in every way.

Here at Buckeye, rayon is an old friend. Back in 1920 we were the first to supply the textile industry with cellulose, basic raw material in rayon. Later we worked hand-in-hand with pioneers in the production of ace-

tate. Today we are still pioneering by constant research and cooperation with the dynamic industries that use the magic ingredient, cellulose. We're ready to give prompt attention to your requirements—just call us.

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MEMPHIS 8, TENN.

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**first in
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Eastman aromatic intermediates for organic reactions

amines

2,5-DIETHOXY ANILINE

Readily soluble in most reaction media; shipped as a free base. Diazotization yields a light sensitive salt. A good starting point for synthesis of naphthol color bases.

PHENYL DIETHANOLAMINE

A reactive intermediate which may be nitrated, sulfonated or halogenated; couples readily with diazo salts to give dye intermediates. Condenses with aliphatic or aromatic aldehydes.

m-TOLYL DIETHANOLAMINE

This aromatic amine undergoes the same reactions as Phenyl Diethanolamine, but the products have slightly different properties due to the methyl group on the aromatic nucleus.

2,5-DIMETHOXY ANILINE

A convenient and economical starting point for Fast Blue 2R salt and other naphthol color bases. Like 2,5-Diethoxy Aniline, it is readily diazotized to yield light sensitive salts. Shipped as a free base.

PHENYL ETHYL ETHANOLAMINE

Undergoes typical tertiary amine reactions, plus esterification, nitration, halogenation, sulfonation. Couples readily with diazo salts to produce dyes and intermediates. Condenses with aromatic aldehydes.

o-TOLYL PROPOXANOLAMINE

Couples with diazo salts to yield azo dyestuffs; may be nitrated, sulfonated, halogenated. Reacts with acids or anhydrides to yield amides, or esters may be formed if the amino group is blocked.

phenols

TECQUINOL® (technical Hydroquinone)

Reacts readily with amines; condenses readily with phthalic and other anhydrides. Useful as a polymerization inhibitor for monomers and is a widely used arrestor for peroxide-catalyzed polymerizations.

2,5-DI-TERT-BUTYL HYDROQUINONE

Insoluble in water and aqueous caustic. A polymerization inhibitor for vinyl-type resin monomers, also an effective antioxidant in vegetable fats and oils, and stabilizer against light deterioration of rubber and synthetic elastomers.

TOLUHYDROQUINONE

A promising raw material for organic syntheses undergoing the same reactions as hydroquinone. The presence of the methyl group introduces slight variations in the product properties.

miscellaneous

HYDROQUINONE MONO METHYL ETHER

A stabilizing agent and antioxidant; soluble in various fats and oils. Its stable ether group makes it a promising raw material for drug, cosmetic and dye syntheses.

ACETANILIDE

Technical grade, used for preparation of sulfa drugs and dye intermediates, and as an intermediate in preparing various aniline derivatives.

p-BENZOQUINONE

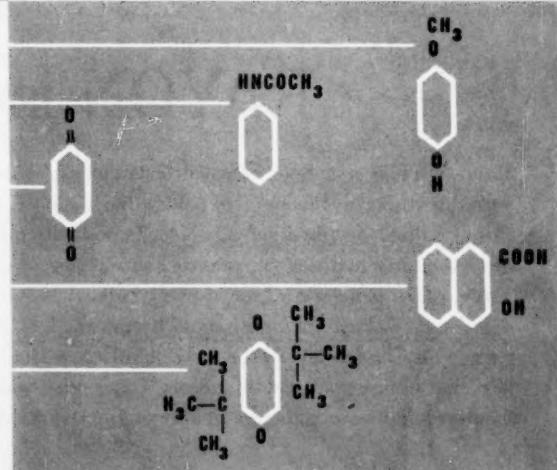
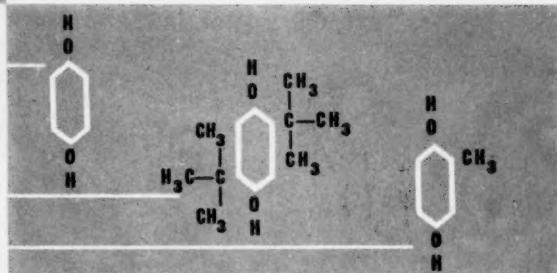
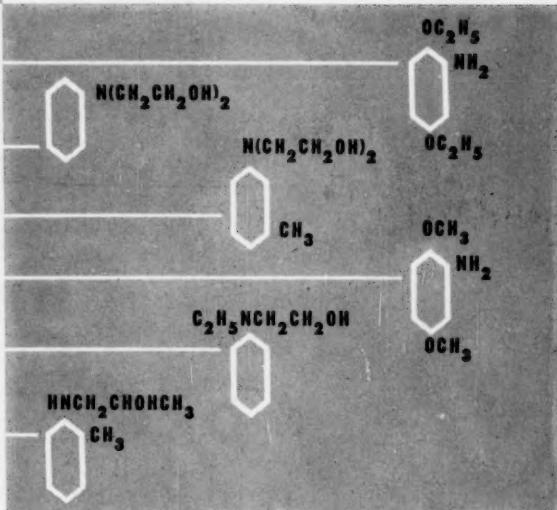
Very reactive due to the unusual number of conjugated double bonds in the molecule. It reacts with activated molecules and can be used as a polymerization regulator. It is also a strong oxidizing agent and may be used where inorganics are unsuitable.

BETA OXY NAPHTHOIC ACID

Quality suitable for use in developing acetate blacks. It also serves as a raw material for the manufacture of various naphthol couplers.

2,5-DI-TERT-BUTYL QUINONE

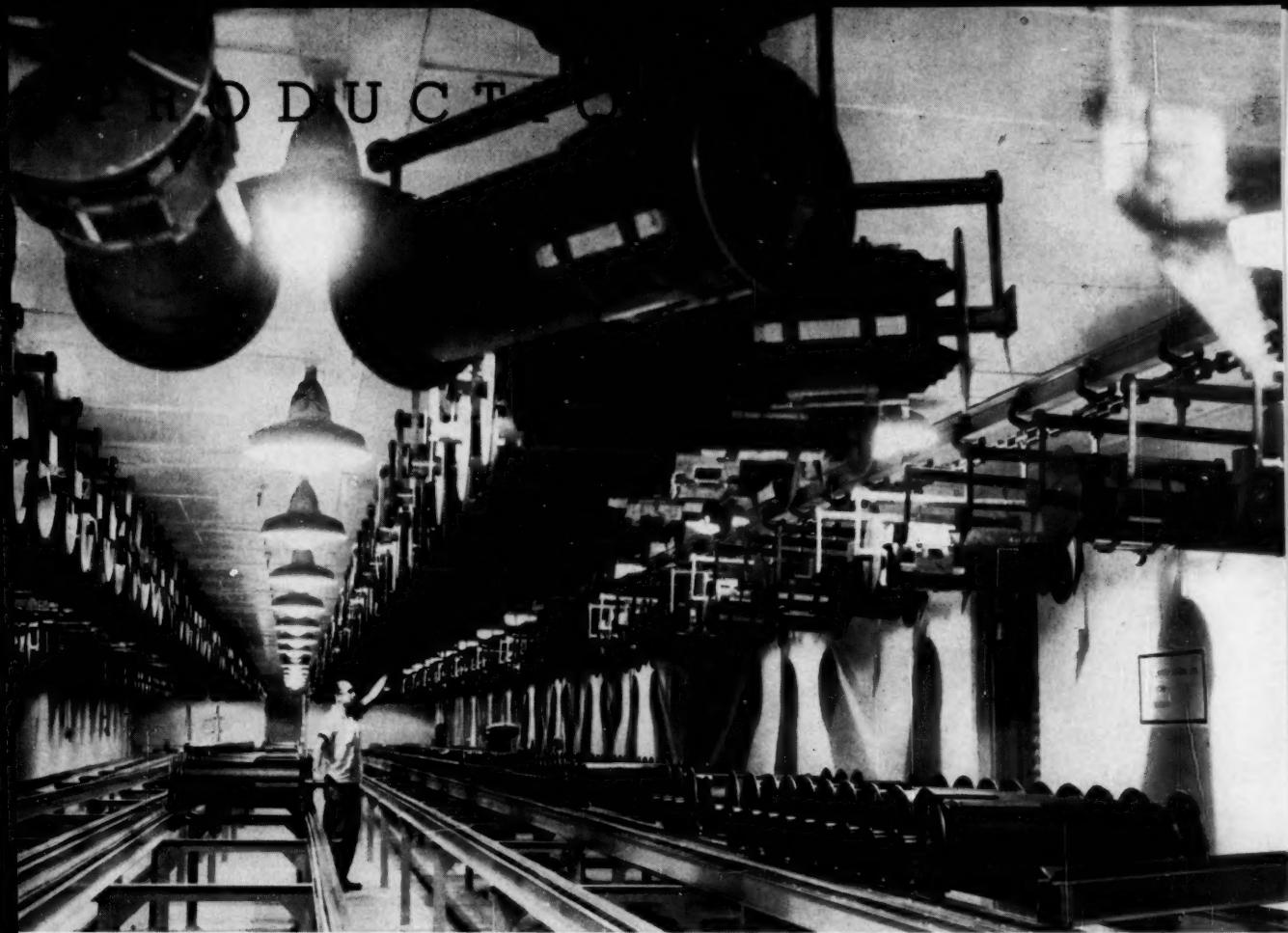
Relatively stable yet highly reactive organic oxidizing agent. Should be tried wherever inorganics have proved unsuitable. Reacts with activated molecules and can be used as a polymerization regulator.



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KINGSPORT, TENNESSEE, subsidiary of EASTMAN KODAK COMPANY

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cincinnati; Cleveland; Chicago; Houston; St. Louis. **West Coast:** Wilson Meyer Co., San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.



Solid propellents (grains) are conveyed through cooling room at McGregor unit, where Phillips gains . . .

Solid Savings in Solid-Fuel Manufacture

Even the process industry's new rocket-fuel field uses down-to-earth techniques when it comes to cost-cutting production improvements. Case in point: the production line for M-15 JATO (booster rockets) solid propellant at Phillips Petroleum's Air Force Plant No. 66 at McGregor, Tex.

When Phillips took the wraps off M-15 production methods at last September's American Institute of Chemical Engineers' meeting in Baltimore, it showed that processing the rubber-base composite propellant was simple, followed closely the widely used technique for production of compounded rubber materials. But this week, Phillips revealed to *CW* more of the methods used to cut process losses 14-fold.

Key to the Phillips effort is correlation of production experience data on the process, product specifications and quality control.

The Process: Drying, grinding the ammonium nitrate oxidizer and blending the fuel-binder (synthetic rubber, carbon black, age resistor, plasticizer, curatives) are the process starting points. The oxidizer and burning-rate catalyst are uniformly dispersed in the binder in a dispersion-blade mixer of the type common in the rubber and plastic industries.

The mixture is pressed into block form, put into an extrusion press where it is consolidated, formed into the desired shape and length. (At this point, the propellant is called a "grain.") The grains are passed through a curing oven, a cooling room, then trimmed to exact length. After metal end-plates have been cemented on, the grains are again cured and cooled. They are loaded into metal cases, and finishing operations (e.g., attaching head, inserting starter disk) are completed.

Phillips learned early in the game how to handle fertilizer-grade ammonium nitrate free of the clay coating usually applied to the prills to improve flow properties. It uses rotary crushing and drying equipment, takes special care to reduce agglomerates and still hold fines to a minimum. Phillips became the first firm to use low-cost ammonium nitrate oxidizer on a commercial basis.

Automatic equipment also helped cut costs: Phillips drew on its petroleum and chemical processing experience in designing the plant for automatic operations controlled from a central control point, installed materials-handling devices with as many automatic features as possible to simplify movement of in-process material through the line.

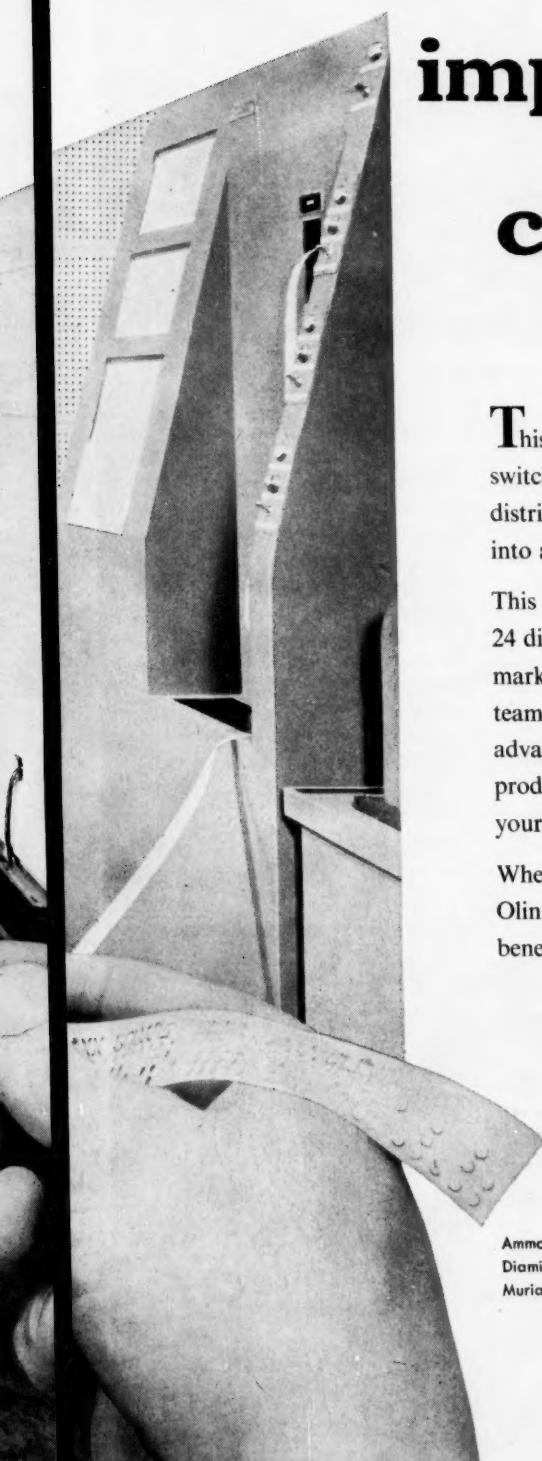
But the firm points out that without experience in quality control and careful analyses of production, the plant

How high-speed



communications . . .

improve your chemical supply



This could be your order coming in on tape to the Baltimore switching center. Just minutes ago you may have called it in to a district sales office. In another few minutes it can be translated into a shipping order within the right Olin Mathieson plant.

This high-speed, private wire communications system, linking 24 divisional offices and plants, puts action into modern chemical marketing. Almost simultaneously all members of your service team can start operating; the traffic man devises the most advantageous shipping, the product manager coordinates production and shipments, and sales service planners balance your orders with inventory control.

When you're planning your chemical requirements, call in an Olin Mathieson representative. Let him show you how you can benefit when high-speed communications are working for you.



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OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.

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HEAT and
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Protection against loss of color, loss of tensile strength and embrittlement are vital to your successful marketing of vinyl products. You know this!

But, perhaps you do not know the complete story of Metasap Vinyl Stabilizers — designed specifically to assure you relief from the effects of heat and light. Whether you are producing film, sheeting, floor tile or plastics there's a Metasap Stabilizer to do the job . . . better. Send for free factual folder today.



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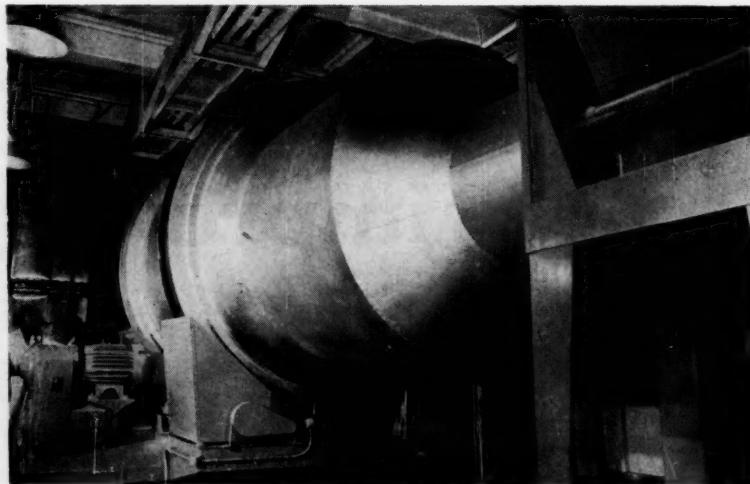
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PRODUCTION



Low-cost ammonium nitrate is dried for use in propellents.

would not be as far advanced in processing and design as it is.

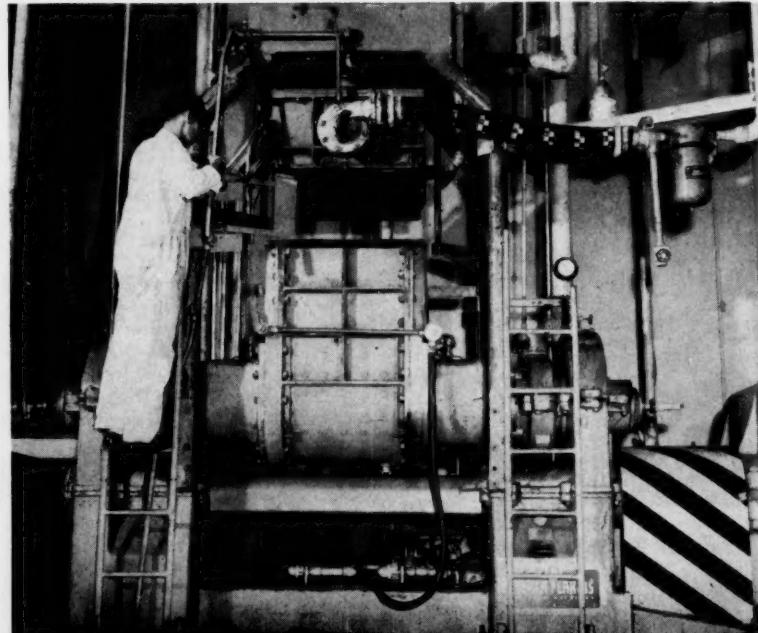
Supplier's Interest: Aiding in at least one phase of the operation was Phillips' special interest in raw materials. As a major supplier of carbon black, synthetic rubber and ammonium nitrate—the ingredients that make up more than 95% of the solid propellant—Phillips was able to turn its own binder-mix production data into immediate savings. Pilot-plant experience indicated that only close control of the carbon black content of the binding mix would yield a satisfactory product. But production experience showed that tolerances could be doubled. This reduced the number of

batch adjustments since the copolymer raw material could be supplied with a carbon black content within the new tolerance limits.

Blending Cut: When production started, the technique was to have the ammonium nitrate oxidizer ground, analyzed for particle size, then blended to a uniform particle-size distribution to help control finished-propellant ballistics. But operating experience again showed that costs could be cut, quality remain unimpaired, without this three-part processing step.

Quality control and process analysis also indicated ways in which scrap could be reduced. Initially, tests for burning rate were conducted after the

Redesign of mixer blades upped blade life from 300 to 4,000 mixes.



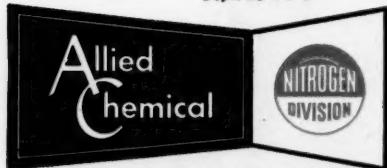
if you're considering its use . . .

ETHYLENE OXIDE



**get all the information you need—from one source
... others have—with satisfactory results**

Dept. EO 1-7-5



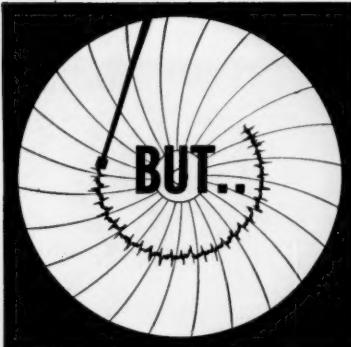
40 Rector Street, New York 6, N. Y.



Write for information on handling and storage,
physical and chemical properties, literature studies,
bibliographies, price quotations and samples
of our material—the purest available commercially.



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Urea • Ethanolamines • Ethylene Oxide • Ethylene Glycols • Formaldehyde • Nitrogen
Tetroxide • Nitrogen Solutions • U. F. Concentrate—85 • Fertilizers & Feed Supplements



Is Solvent Recovery Practical?

You bet it is! With a solvent recovery system, practically all kinds of volatile solvents and solvent mixtures can be recovered safely, efficiently, and economically. So, solvent recovery is practical because it means increased profits.

Here's why:

- The initial cost of a solvent becomes a secondary consideration. High priced solvents can be used at no extra operating cost.
- Solvents can be reused indefinitely. During periods of solvent shortages, efficient recovery is invaluable.
- Fire and health hazards are reduced and you have a closer check on solvent evaporation rates.

Solvent recovery plants are designed to suit your particular needs whether 50 or 100,000 gallons a day. In most cases, solvents can be recovered with an efficiency of more than 99% at a cost of 1 to 2¢ per pound. The investment is moderate too. Some recovery plants running at capacity pay for themselves in less than a year. Under other conditions, it takes only two or three years.

CARBIDE has much more information on how a COLUMBIA Activated Carbon Solvent Recovery plant can cut your processing costs. Write now!

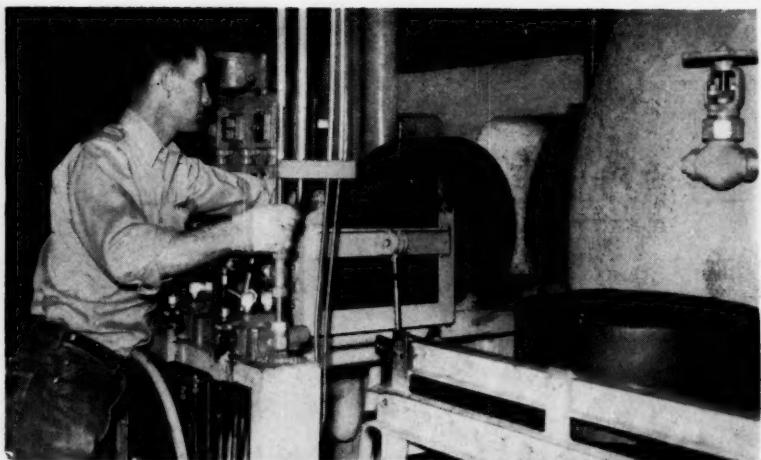
**UNION CARBIDE
CHEMICALS COMPANY**

Division of  Corporation

30 East 42nd Street, New York 17, N. Y.

"Columbia" is a registered trade-mark of UCC.

PRODUCTION



Blocking of propellant mixture eases loading of extruder.

propellant was formed and cured. By moving the test up to mixing stage, off-standard propellant batches are corrected while still in process.

And tests showed that propellant trimmings, physical-defect and burning-rate rejects could be reworked to yield a propellant mix that could not be distinguished from 100% virgin material. Though Phillips has yet to determine the upper limit of scrap propellant that can be used, it is well above the normal amounts of scrap encountered in the plant. Ultimate aim is complete elimination of process losses except for contaminated scrap (i.e., floor sweepings). Total rejection cost percentage is already below 1% of deliverable unit cost.

And process equipment has been

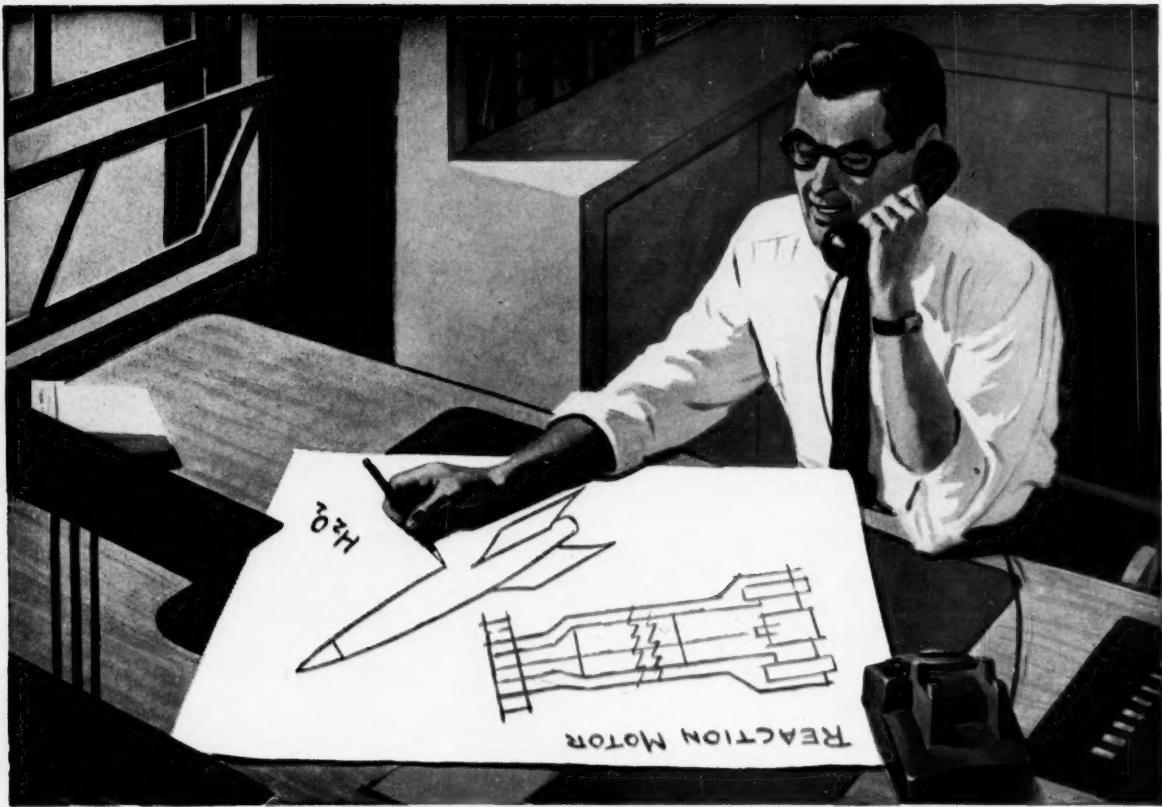
redesigned. Dispersion-mixer blades, cored for cooling water, were failing after 300 mixes because of design weakness. After redesign, blade-life increased to about 4,000 mixes. High maintenance costs pinpointed required changes in vacuum controls and indicators on presses.

Other Savings: Production experience has substantiated explosive classification tests, shows that fire is the only hazard in propellant manufacture. Conductive flooring in process areas, conductive shoes, coveralls and other special clothing are not needed.

With today's emphasis on holding the line on production costs, Phillips' success with cost cutting through thorough analysis of plant experience shows one route that can be tried.

Extruded grain is checked for defects, reworked if defective.





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MARKETS

1957 End-Use Pattern for Calcium Chloride



Maintenance of unpaved roads 30%



Industrial processing 17%



Winter maintenance of highways 15%



Concrete production 13%



Brine refrigeration, others 25%

Calcium Chloride Continues Its Climb

With just a month to go in '57, it's plain that U.S. output of calcium chloride will hit an all-time high this year. Up-to-the-minute estimates are for U.S. makers to turn out about 560,000 tons of solid material, and some 170,000 tons of the liquid this year—representing gains of 36% and 19% over production in '53, when a slipping calcium chloride market first showed signs of recovery. Reason for the rapid uptrend: stepped-up highway construction.

Standing to gain most from the surge in demand are the three producers providing the bulk of U.S.-made calcium chloride: Solvay and Columbia-Southern, making it via the

ammonia-soda process, and Dow, producing it from brine. The former process, say market followers, provides about 60% of total U.S. output of the material. Though individual producers are silent about actual plant capacities, they all vouch for ample supplies to meet burgeoning domestic needs.

Highway Hike: Full appraisal of calcium chloride markets necessitates a review of the multibillion-dollar federal-aid highway program. The federal appropriation of a hefty \$24.8 billion is for construction and improvements of the national system of interstate highways, to be completed by '69.

About 10% of this amount will be matched by state government appropriations, bringing the total to about \$26.6 billion. In addition, the federal government will match state funds on a 50-50 basis for improving and constructing local primary, secondary and urban road systems. These amounts, plus normal state, city and local expenditures for roads and highways, bring a grand total of at least \$100 billion to be spent by '69.

Although calcium chloride is used more for maintenance of unpaved roads than for construction of paved pikes, it stands to gain mightily from the highway program. Reason: it will be used widely to improve the



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MARKETS

temporary roads and detours—and it plays a vital role in the stabilization of shoulders of paved roads.

Even now—before the highway program has reached full stride—highways demand an easy 30% of total U.S. calcium chloride production for use as a stabilizer and dust preventer. A large part of the nation's roads are still unpaved—i.e., composed of gravel, limestone or sand-clay. Constantly increasing traffic of heavy cars and trucks break down these uncovered surfaces; and though paved roads are, of course, preferable, many communities are not wealthy enough to build them.

Calcium chloride, say its proponents, has proved valuable in answering this problem of secondary road maintenance; it absorbs water from the air, retains it for long periods of time. Its effect is to compact soil aggregates into surface that's dust-free and safe for driving—both are important public relations factors to local officials, as emphasized at the recent American Assn. of State Highways convention held in Chicago a few weeks ago.

Solid Shoulders: Engineers will likely turn to calcium chloride for maintenance of shoulders of the nation's future ribbons of highways. Some industry spokesmen peg current consumption of the salt in this small but profitable outlet as high as 5% of total calcium chloride use—and say this figure is bound to grow. Producers of the chemical are stepping up their drive for this market, now shared with makers of other important stabilizers, such as hydrated lime.

Winter Maintenance: Increased traffic and the expanding network of roads is the boosting factor of the chloride's usage in winter maintenance of highways—a growing outlet that now accounts for 13-15% of total chloride consumed. The chemical is applied to icy roads either pre-mixed with abrasives or in combination with rock salt.

Concrete Production: Usage by concrete and cement makers ranks third among important outlets for calcium chloride, takes about 13% of total U.S. consumption. Addition of the chloride to these construction materials helps accelerate setting of concrete—especially important in cold weather—and adds strength to the firmed concrete.

Calcium chloride manufacturers now optimistically look for still larger demands for their product in this market as a direct result of the American Concrete Institute's recent acceptance of the use of the chloride in concrete. Cement production is climbing steadily—also boosted by the highway program. Approximately 330 million bbls. will be made in '57, 40% more than the 226 million bbls. produced in '50. Calcium chloride producers predict that this outlet will show the largest rate of growth in the next few years.

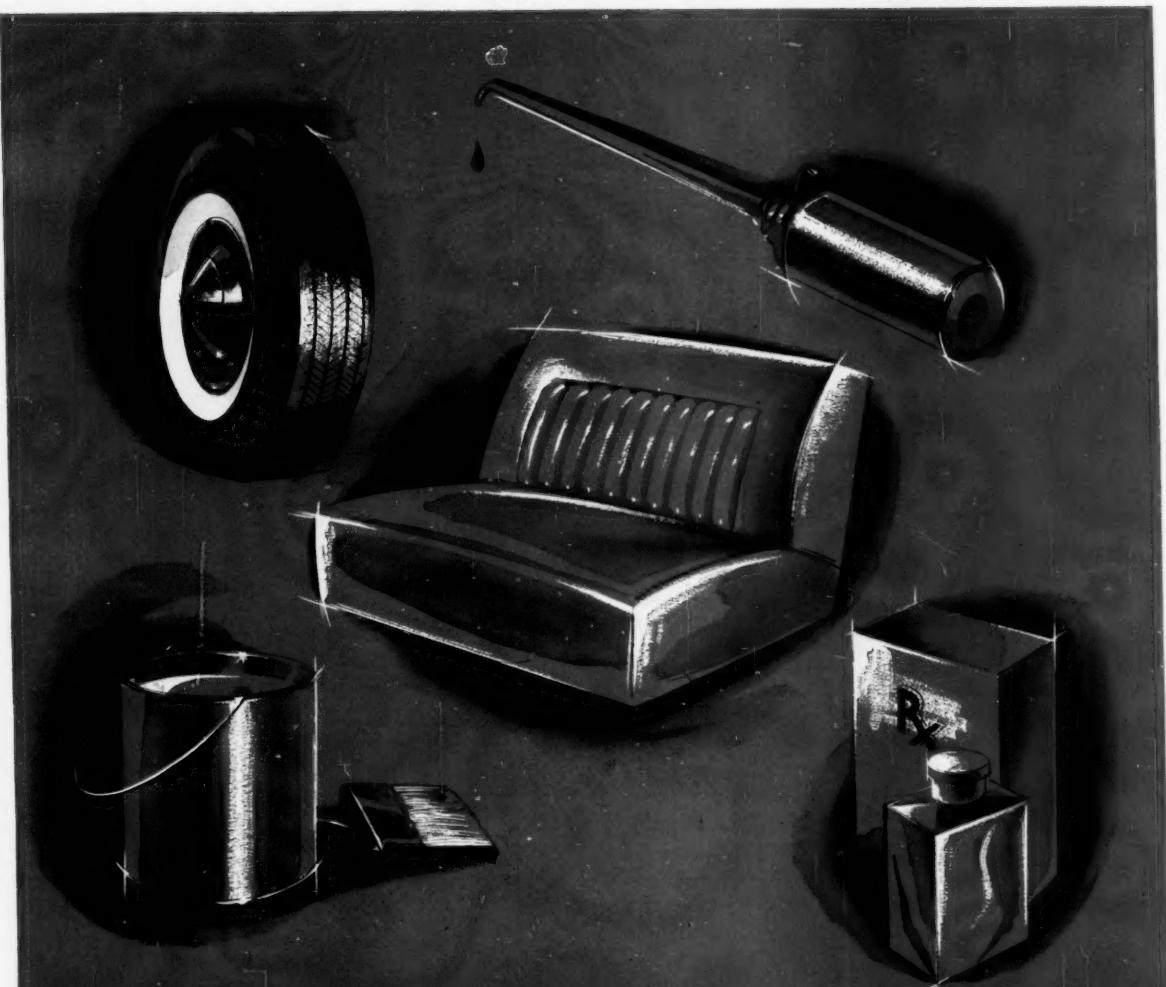
Factors, other than the federal highway program, that have helped spur concrete and cement output to new highs:

- Atomic energy construction, which utilizes cement as a radiation shield, among other uses.
- Conservation and flood-control building programs.

Domestic calcium chloride production

	Solid and flake (77-80% basis) (thousand tons)	Liquid (40-45%) (thousand tons)
1951	433	148
1952	427	158
1953	412	143
1954	438	157
1955	517	161
1956 (CW est.)	535	165
1957 (CW est.)	560	170

* Excludes quantity used to produce solid.



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MARKETS

- Increasing outlays for public works.

Industrial Processing: Calcium chloride has many uses in various process industries. For example, it plays important roles in reclaiming of rubber, as a lubricating oil additive, in sodium metal and lithium chloride manufacture, and in the production of paper, gypsum and plastics. Because its uses are so diversified, it's anyone's guess as to how much goes where. Best available estimates are that about 17% of total calcium chloride consumption is used in such industrial processes.

Another difficult area to pinpoint: resale of the chloride for private uses, e.g., dust-laying, ice control, drying.

Calcium chloride has been used for over 30 years for removal of ice and snow around stores, theaters, factories, apartment buildings, etc., especially at low temperatures where rock salt is ineffective. It has proved most effective in absorbing dampness in basements, stockrooms, food plants, work shops, and similar places. The chemical is also a popular dust controller in parking and loading areas, tennis courts, playgrounds, campgrounds and other unpaved areas.

Amounts of calcium chloride used in these outlets are impossible to tabulate, but close to 10% of total calcium chloride consumption is accounted for by resales.

Other calcium chloride uses with more clearly evaluated markets include:

- Brine refrigeration; one of the oldest uses of the chemical. This now takes 4-5% of the total consumed.
- Weighting of tractor tires with calcium chloride solution to prevent skidding, reduce tire wear. This use accounts for 3-4% of the chloride market.
- Fire-fighting equipment uses, which take about 1% of total consumption.
- Freezeproofing of minerals (e.g., coal, iron ore) for shipments during cold weather. This accounts for another 1%.
- Drying agent applications, which take about 1%.

These and a host of other uses for calcium chloride are relatively small, individually, though significant in the aggregate. But it's clear that the real bonanza for chloride producers now, and in the future, will be found out on the open road.



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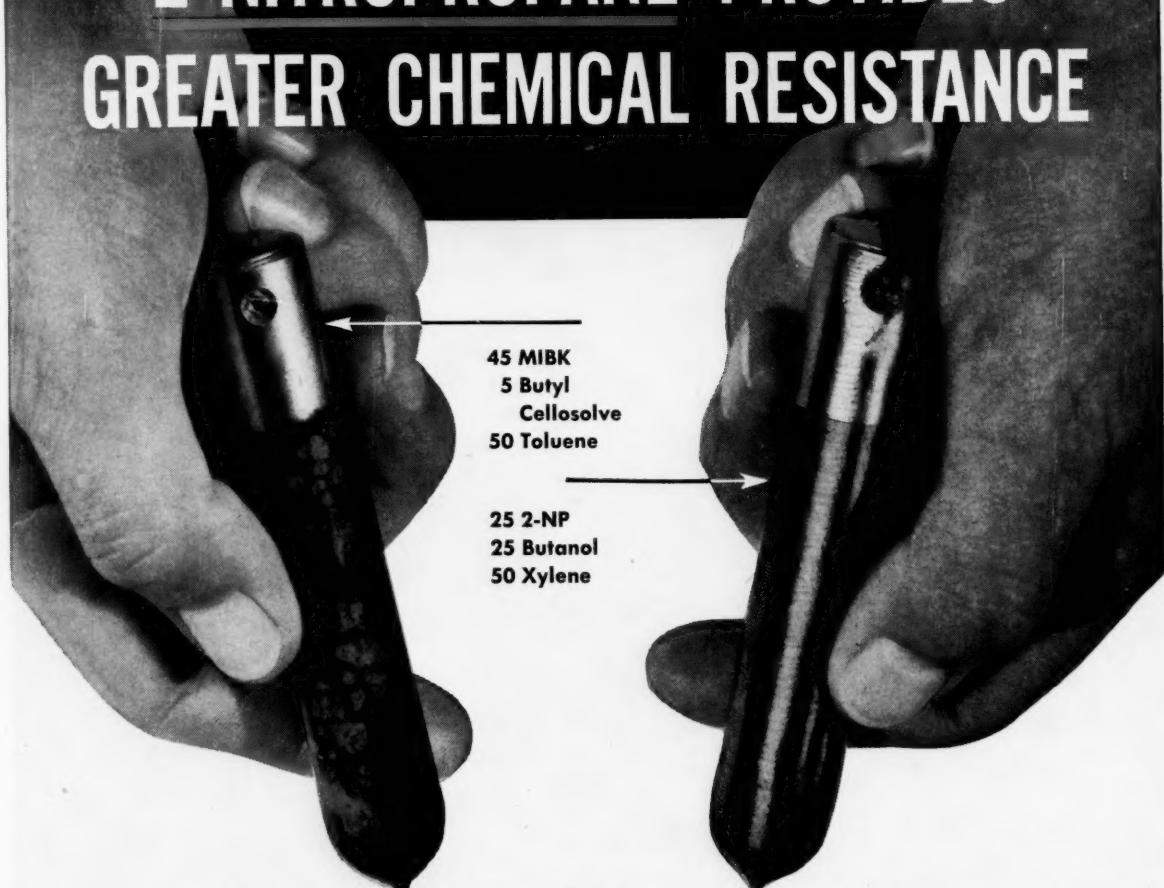
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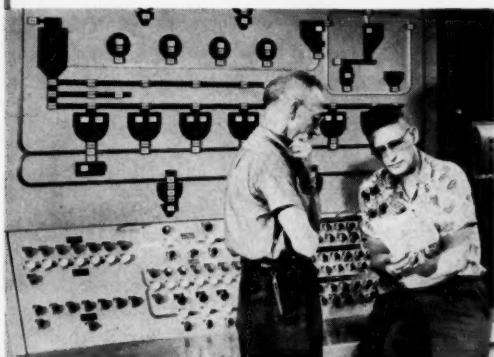
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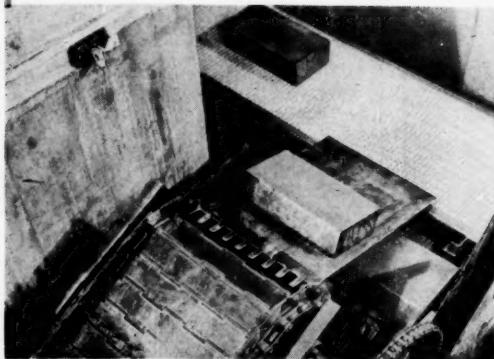
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ENGINEERING



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New Recipe for Fast-Baked Carbons

The time-slashing aspects of National Carbon's new resistance-baking technique for industrial carbon manufacture—it cuts baking time from eight weeks to eight minutes—have almost obscured the other features of National's new 12-million-lbs./year plant at Lawrenceburg, Tenn. (*CW Technology Newsletter*, Aug. 17).

But, as NC's engineers pointed out to *CW* last week, the speed of resistance-baking is just one of its several pluses, which include greatly improved quality control and rapid evaluation of developmental work. Moreover, broad use of automation has brought plain labor savings and products improved in uniformity and permeability.

At the new multimillion-dollar plant, already in operation, it is the speedy observation of results permitted by the rapid bake that simplifies quality control. Instead of waiting out the long baking period required

by conventional methods, company engineers can now determine almost immediately the quality of a given run, make on-the-spot control adjustments where necessary.

The Automatic Weigh: Automation is used at the Lawrenceburg plant to a degree unknown in old plants. It's first employed in the automatic weighing and blending of the raw materials to bring the prepared mix to the hydraulic press that forms the carbon pieces, then used to convey finished parts to the shipping area.

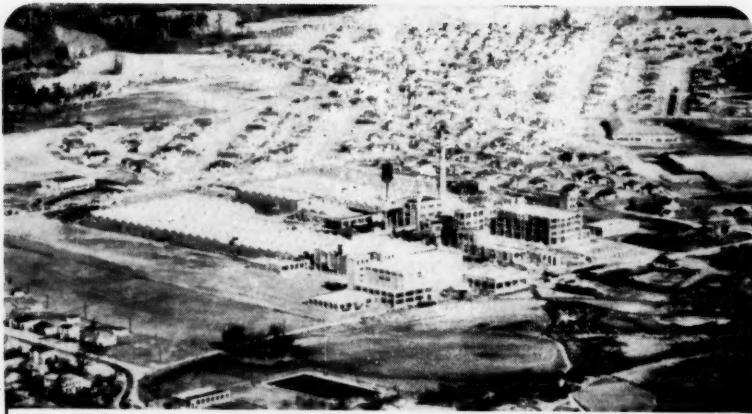
The specially designed hydraulic press is the heart of the new baking system. It electrically heats the carbon-binder mixture to about 2000 F, at the same time applying pressure of several tons/square inch to the piece being molded. The combination of heat and pressure permits the lightning baking.

Also contributing to the high

speed, electric baking is a special—and still undisclosed—processing of the raw materials, which gives a more intimate blend of the carbon flour and binder (such as tar or pitch). Conventional processing results in a mixture with such high resistance that extremely high voltage is needed to force through enough current to raise the mix to baking temperature. In the new method 3,000-100,000 amps. are passed through the mixture at low voltage.

Officials say that high quality products made by the new method will cost no more than those produced by the old furnace method.

Still another vital point in control of the new method is a controlled baking rate. The rate must be slow enough to allow gases formed when the binder is heated to escape from the molded product. Gas pockets would weaken the structure of the



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ENGINEERING

product, if not actually rupture it.

Although concern has been voiced over the ability of the method to make products of extreme shapes, the firm says that a wide variety of products will be made, ranging from large blocks to brushes for motors and generators.

For the Perfect Fuel

How do you concoct the perfect chemical fuel for jet-age aircraft and missiles? Many chemical companies interested in this fast-growing fuels market would like to know. Some clues to the answer were summed up this week at the 12th Annual Meeting of the American Rocket Society in New York's Statler Hotel by W. G. Berl and W. T. Renich, of Johns Hopkins University (Silver Spring, Md.).

The specific materials discussed by Berl and Renich were fuels for ramjets. Though they haven't been as much in the news as other types of supersonic power plants, ramjets may be slated for a major supporting role in future aircraft. Their biggest asset: a wide range of operating speeds that bridges the considerable gap between relatively slow, conventional jet engines and high-speed rockets.

As air-breathing engines, ramjets develop thrust by the combustion of fuel in air. In this respect, they're similar to the more conventional jet engines, have many of the same fuel requirements. In general, say Berl and Renich, a satisfactory fuel must be judged by many characteristics and properties—availability and cost, air specific impulse, fuel weight specific impulse, to list a few. Since no one material is tops in all of these categories, selection of the ideal chemical fuel must necessarily be a compromise.

Light Elements Best: Judging a fuel solely on its thermodynamic properties, it's easy to see why the light elements in the periodic table are the chief contenders. The energy released by the combustion of fuel in air is proportional to the number of oxygen bonds formed in the production of one mol of oxide (upper limit is about 160 kcal./oxygen bond). And since there are more mols per pound of the light elements, they have higher heat contents (on a fuel-weight basis) than do the heavier elements.

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ENGINEERING

in the theoretical analysis of ramjet performance, say Berl and Renich, is the propulsive effect of the fuel. This takes into account the thermodynamic changes produced by combustion and the physical state of the fuel mixture and of the combustion products. For all fuels whose heat of formation is positive, total temperature after combustion reaches a maximum when the air-to-fuel ratio approximates the stoichiometric ratio. It's this ratio that largely determines the all-important measure of performance—specific impulse.

Thrust Measures: The best yardstick for measuring the performance of different fuels, say Berl and Renich, is the "stream thrust"—i.e., the difference between thrust at the inlet and at the exhaust. But the two most common (and sometimes confusing) measures of thrust are determined by the values achieved when fuel is burned in air, at the ratio shown above, to give maximum total temperatures.

• Air specific impulse (S_a) is the value of the thrust resulting from combustion of the optimum fuel-air mix per unit weight of air taken into the engine.

• Fuel specific impulse (S_f) is the thrust developed by the same fuel-air mixture per unit weight of fuel consumed.

Comparison of the specific impulses of the light elements (at stoichiometric ratios) shows a gradual increase in S_a , accompanied by a very rapid drop in S_f , as molecular weight increases. Here's how these factors help to predict makeup of good chemical fuel:

Hydrogen has the highest fuel specific impulse rating and, from a strictly thermochemical standpoint, is tops as a chemical fuel. However, hydrogen rates lower in air specific impulse than lithium, beryllium or boron, has many unfavorable physical properties such as its very low density in the liquid state. (A unit volume of a typical hydrocarbon, such as heptane, holds almost three times as much hydrogen as an equivalent volume of liquid hydrogen.) Therefore, it's most desirable, Berl and Renich point out, to concentrate on hydrogen derivatives of boron, carbon or beryllium if high fuel specific impulse values are required.

Fuel Economy: From the standpoint of cost and availability, the hydrocarbons have an edge on high-

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Irradiation Hits a New High

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*The glow, caused by ionization, of the medium surrounding the radiation source.

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CHARTING
BUSINESS

December 7, 1957



Source: Bureau of Labor Statistics.

*Estimate based on 8 month average employment record.

Charting the Impact of Automation

Though total employment in chemical and allied industries has grown some 21% over the past 10 years—to an estimated 835,000 in '57 from 692,000 people in 1947—the ratio of production workers to non-production workers has decreased considerably, 3:1 to about 2:1. Main reason, of course, has been the trend toward automation.

In the chemical and allied industries, as in other industries, automation has resulted in fewer require-

ments for routine, unskilled labor, has upped demand for highly trained personnel. Today, production workers represent about 65% (some 542,000) of the total chemical industries labor force, nonproduction workers 35% (about 293,000). Back in '47, production workers totaled 76% (523,000), nonproduction 24% (169,000). Thus, within 10 years, the skilled labor force of the chemical industries has grown 73%, nonskilled some 3.5%.



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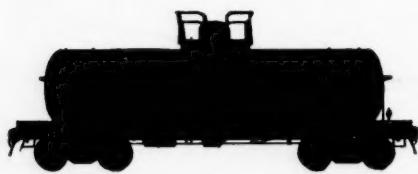


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